



ROY COOPER
Governor

MICHAEL L. HOLDER
Acting Secretary

January 11, 2017

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Mr. Steve Kichefski
NCDOT Coordinator

Subject: **Application for Modification to the Section 401 Individual Permit and Section 401 Water Quality Certification** for Section C of the proposed US 74 Shelby Bypass in Cleveland County from just west of the First Broad River to just east of the NC 150 Interchange. Federal Aid Project No. NHF-74(14), State Project No. 8.1801001, WBS Number 34497.1.2, Division 12, TIP R-2707C.
Debit \$570 from WBS Number 34497.1.2.

Reference: USACE Individual 404 Permit Action ID SAW-2009-01449, issued April 12, 2013.
NCDWR Project No. 20120673 Certification No. 3941, issued September 18, 2012.
Individual 404 Permit Modification issued October 23, 2013.
401 Water Quality Certification Modification issued August 9, 2013.
Amended Biological Opinion issued November 9, 2012.

Dear Sir:

The purpose of this letter is to request a modification to the United States Army Corps of Engineers (USACE) Section 404 Individual Permit and North Carolina Division of Water Resources Section 401 Certification for the above referenced project. The original 2012 permit application (submitted July 9, 2012) and subsequent permits (referenced above) presented final impacts for R-2707A, R-2707B and preliminary impacts for R-2707C, R-2707D and R-2707E. This modification presents the final design impacts for R-2707C.

Please see the enclosed ENG form, Division of Mitigation Services (DMS) mitigation acceptance letter, permit drawing review minutes (4B and 4C), stormwater management plan (SMP), permit drawings, and roadway plansheets for Section C.



State of North Carolina | Department of Transportation | PDEA-Natural Environment Section
1020 Birch Ridge Drive, 27610 | 1598 Mail Service Center | Raleigh, North Carolina 27699-1598
919-707-6000 T 919-212-5785 F

Summary of R-2707C Jurisdictional Impacts:

The preliminary design impacts projected from the 2012 permit application for R-2707C were 7,274 linear feet of permanent stream impacts, 0.92 acres permanent impacts to wetlands and 2.96 acres of temporary stream impacts. Final design impacts for R-2707C are **7,644** permanent impacts to streams, **0.94 acres** of permanent impacts to wetlands and **3.09 acres** of temporary stream impacts. The increases in impacts from preliminary to final design are due to the following:

- Two additional sites were added (Site 1 – bank stabilization for the First Broad River bridges & Site 20 – JS crossing not addressed in preliminary design)
- Bank stabilization was added at upstream ends of major cross pipes

Totals of the individual water resources impacted by each section can be found in Table 1.

Table 1 – Summary of Wetland Impacts for R-2707

Section	Design Stage	Wetland Impact Type	Wetland Impact Area (ac)	Wetland Impacts Requiring Mitigation (ac)
R-2707A	Final	Perm. Wetland Fill	0.35	0.43
		Excavation in Wetlands	0.03	
		Mechanized Clearing in Wetlands	0.05	
R-2707B	Final	Perm. Wetland Fill	3.37	3.62
		Excavation in Wetlands	--	
		Mechanized Clearing in Wetlands	0.25	
R-2707C	Final	Perm. Wetland Fill	0.91	0.94
		Excavation in Wetlands	0.01	
		Mechanized Clearing in Wetlands	0.02	
R-2707D	Preliminary	Perm. Wetland Fill	0.38	0.40
		Excavation in Wetlands	--	
		Mechanized Clearing in Wetlands	0.02	
R-2707E	Preliminary	Perm. Wetland Fill	0.66	0.66
		Excavation in Wetlands	--	
		Mechanized Clearing in Wetlands	<0.01	
Total				6.05

Table 2 – Summary of Stream Impacts for R-2707

Section	Design Stage	Stream Impact Type	Impact Length (lf)	Temporary Impacts (ac)	Stream Impacts Requiring Mitigation (lf)
R-2707A	Final	Permanent Fill	1,489	--	1,489
		Bank Stabilization	81	--	
		Temporary	--	0.03	
R-2707B	Final	Permanent Fill	3,535	--	3,535
		Bank Stabilization	85	--	
		Temporary	--	0.13	
R-2707C	Final	Permanent Fill	7,126	--	7,126
		Bank Stabilization	518	--	
		Temporary	--	0.08	
R-2707D	Preliminary	Permanent Fill	5,840	--	5,840
		Bank Stabilization	76	--	
		Temporary	--	0.07	
R-2707E	Preliminary	Permanent Fill	2,805	--	2,805
		Bank Stabilization	39		
		Temporary	--	0.01	
Total			21,758	0.34	20,795

Summary of Utility Impacts:

There are currently no impacts associated with utility relocations in C Section of this project; however, Duke Energy has not released any final plans for a new pipeline near the project.

Summary of Mitigation:

Mitigation for impacts resulting from the Section C will be provided by DMS. See tables 5 and 6 for a summary of the mitigable impacts resulting from this Section. Total mitigable impacts for Section C include 0.94 acre of wetlands and 7,126 linear feet of stream.

NEPA DOCUMENT STATUS

The Final Environmental Impact Statement (FEIS) for the US 74 Shelby Bypass (R-2707) was approved January 25, 2008 with the Record of Decision (ROD) being approved December 1, 2008. A Right of Way Consultation was completed in September 2014. Additional copies will be provided upon request.

In compliance with the NEPA/404 Merger Process, Concurrence Point 4B was reached for R-2707C on September 8, 2003. Concurrence Point 4C was reached September 21, 2016.

PROJECT SCHEDULE

The project is permitted in phases due to project size, funding and TIP schedule (see Table 3). Sections A and B were permitted together in 2013. Section C of this project is scheduled to let on May 5, 2017 with a review date of March 28, 2017 and is covered in this phased permit modification request. Section D lets in January 2, 2030 and Section E lets December 21, 2021.

Table 3 – Project phasing for US 221 Widening (R-2707)

Section	Approximate Section Limits	Approximate Length	Construction Letting
R-2707 A	West of SR 1162 to west of SR 1314	3.93 miles	May 2013
R-2707 B	West of SR 1314 to west of NC 226	3.17 miles	April 2014
R-2707 C	West of NC 226 to west of NC 150	4.79 miles	May 2017
R-2707 D	West of NC 150 to existing US 74 west of SR 2238	4.09 miles	Feb 2015
R-2707 E	Existing US 74 west of SR2238 to west of SR 1001	2.64 miles	Sept 2019
TOTAL		18.62 miles	

IMPACTS TO WATERS OF THE U.S.

Tables 4 and 5 summarize the impacts to jurisdictional water resources for the final design of R-2707C. Site numbers correspond with the permit drawings included in this application. The stream and wetland numbers correspond to the 2009 Reverification package. A brief description of each impact site will follow the tables.

Table 4 – R-2707C Wetland Impacts*

Site	Wetland Number	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Impacts Requiring Mitigation (ac)
5	bwb**	0.02	0.02	--	--	--	0.02
6	bwa**	0.19	0.19	--	--	--	0.19
8	qa**	<0.01	<0.01	--	--	--	<0.01
12	bxf**	0.14	0.14	--	--	--	0.14
16	bwj**	0.45	0.45	--	--	--	0.45
19	bwt	0.09	0.02	<0.01	<0.01	--	0.02
21	bqa	1.56	0.08	<0.01	0.02	--	0.11
Total Impacts			0.91	0.01	0.02	--	0.94***

* All wetlands impacted are riparian

** Total take of wetland

*** Values are based on rounding, due to calculating totals with actual numbers to the thousandths

Table 5 – R-2707C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Id.	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ²
1	First Broad River (P)	4-7	Perm. Fill	--	--	
			Bank Stabilization	19	--	--
			Temp Fill	--	0.05 (30')	--
2	UT to First Broad River (P)	4-10	Perm. Fill	358	--	USACE & DWR
			Bank Stabilization	22	--	DWR
			Temp Fill	--	<0.01 (60')	--
3	UT to First Broad River (P)	4-11	Perm. Fill	322	--	USACE & DWR
			Bank Stabilization	39	--	DWR
			Temp Fill	--	<0.01 (30')	--

Table 5 Continued – R-2707C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ²
4	UT to First Broad River (P)	4-13	Perm. Fill	340	--	USACE & DWR
			Bank Stabilization	55	--	DWR
			Temp Fill	--	<0.01 (31')	--
5	UT to First Broad River (P)	4-15	Perm. Fill	163	--	USACE & DWR
			Bank Stabilization	25	--	DWR
			Temp Fill	--	<0.01 (16')	--
7	UT to First Broad River (P)	4-17	Perm. Fill	498	--	USACE & DWR
			Bank Stabilization	50	--	DWR
			Temp. Fill	--	<0.01 (26')	--
8	UT to First Broad River (I)	4-20	Perm. Fill	245	--	USACE
			Bank Stabilization	33	--	--
			Temp. Fill	--	<0.01 (31')	--
9	UT to First Broad River (I)	4-28	Perm. Fill	163	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--
10	UT to First Broad River (P)	4-21	Perm. Fill	328	--	USACE & DWR
			Bank Stabilization	44	--	DWR
			Temp Fill	--	<0.01 (26')	--
11	UT to First Broad River (P)	4-26	Perm. Fill	294	--	USACE & DWR
			Bank Stabilization	--	--	DWR
			Temp Fill	--	<0.01 (18')	--
12	UT to First Broad River (P)	4-23	Perm. Fill	161	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (23')	--
13	UT to First Broad River (P)	4-22	Perm. Fill	1,274	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (22')	--
14	UT to First Broad River (P)	4-24B	Perm. Fill	384	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (15')	--
15	UT to First Broad River (I)	4-24A	Perm. Fill	176	--	USACE
			Bank Stabilization	17	--	--
			Temp Fill	--	<0.01 (32')	--
16	UT to Hickory Creek (P)	5-1	Perm. Fill	453		USACE & DWR
			Bank Stabilization	20	--	DWR
			Temp Fill	--	<0.01 (86')	--
17	UT to Hickory Creek (P)	5-3	Perm. Fill	533	--	USACE & DWR
			Bank Stabilization	35	--	DWR
			Temp Fill	--	<0.01 (38')	--
18	Hickory Creek (P)	5-7	Perm. Fill	747	--	USACE & DWR
			Bank Stabilization	69	--	DWR
			Temp Fill	--	<0.01 (25')	--

Table 6 Continued – R-2707C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ²
19	UT to Hickory Creek (P)	5-8	Perm. Fill	64	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (29')	--
20	UT to Hickory Creek (P)	5-3	Perm. Fill	235	--	USACE & DWR
			Bank Stabilization	27	--	DWR
			Temp Fill	--	<0.01 (31')	--
21	UT to Hickory Creek (P)	5-11	Perm. Fill	211	--	USACE & DWR
			Bank Stabilization	23	--	DWR
			Temp Fill	--	<0.01 (27')	--
22	UT to Kings Mountain Reservoir (P)	6-3	Perm. Fill (Per.)	177	--	USACE & DWR
			Bank Stabilization	40	--	DWR
			Temp Fill	--	<0.01 (25')	--
Total Temporary Impacts:				--	0.10 (598')	--
Total Permanent Impacts:				7,644	--	--
Permanent Impacts Requiring DWR Mitigation:				6,927	--	--
Permanent Impacts Requiring USACE Mitigation:				7,126	--	--

Permit Site 1: 19 lf of permanent impacts will result from bank stabilization at the outfall ditch from a hazardous spill basin. The need for a temporary work bridge/causeway at the First Broad River bridges is not anticipated; however temporary impacts (0.05 ac), in between the proposed bridges, will be left in the permit drawings to accommodate unforeseen bridge demolition/construction issues.

The following Permit Sites 2 – 22 all have temporary impacts of <0.01 ac:

Permit Site 2: 358 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-10, into a new 66" RCP with 22 lf of bank stabilization at the pipe inlet.

Permit Site 3: 322 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-11, into a new 42" RCP with bank stabilization totaling 39 lf at both ends of the new pipe.

Permit Site 4: 340 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-13, into a new 72" RCP with bank stabilization totaling 55 lf at both ends of the new pipe.

Permit Site 5: 163 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-15, into a new 66" RCP with 25 lf of bank stabilization at the outlet of the new pipe. Roadway fill will result in the total take of <0.01 ac Wetland qa.

Permit Site 6: A 0.99ac pond will be drained causing a total take on 0.19 ac Wetland bwa. Upon draining of the pond, area inside Right of Way is to be seeded as a wetland with native grasses, and the remainder of area inside TDE is to be stabilized with regular approved seed and mulch. A site meeting will be required to review condition of pond after draining.

Permit Site 7: 498 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-17, into a new 1@ 8x8 RCBC with 50 lf of bank stabilization at the outlet of the new pipe.

Permit Site 8: 245 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-20, into a new 48" RCP with bank stabilization totaling 33 lf at both ends of the new pipe. Roadway fill and bank stabilization will result in the total take of <0.01 ac Wetland qa.

Permit Site 9: 163 lf of permanent impacts will result from the burial of a UT to First Broad River, Stream 4-28, in roadway fill.

Permit Site 10: 328 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-21, into a new 66" RCP with bank stabilization totaling 44 lf at both ends of the new pipe.

Permit Site 11: 294 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-26, into a new 54" RCP.

Permit Site 12: 161 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-23, into a new 54" RCP. An old pond that has reverted to a wetland will have its berm breached which will remove much of the hydrology for the 0.14 ac Wetland bxf. Though some hydrology will remain, NCDOT will consider Wetland bxf to be a total take.

Permit Site 13: 1,274 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-22, into a new lateral base ditch. Natural Stream Design was not feasible at this location due to site restrictions and lack of suitable buffer.

Permit Site 14: 384 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-24B, into a new 72" RCP.

Permit Site 15: 176 lf of permanent impacts will result from the realignment of a UT to First Broad River, Stream 4-24A, into a new 36" RCP with 17 lf of bank stabilization at the pipe outlet.

Permit Site 16: 453 lf of permanent impacts will result from the realignment of a UT to Hickory Creek, Stream 5-1, into a new 60" RCP with 20 lf of bank stabilization at the inlet of the new pipe. Roadway fill will result in the total take of 0.45 ac Wetland bwj.

Permit Site 17 533 lf of permanent impacts will result from the realignment of a UT to Hickory Creek, Stream 5-3, into a new 66" RCP with 35 lf of bank stabilization at the pipe inlet.

Permit Site 18: 747 lf of permanent impacts will result from the realignment of a Hickory, Stream 5-7, into a new 1@ 9x7 RCBC and 66" RCP with bank stabilization totaling 69 lf at the inlets and outlets of both structures.

Permit Site 19: A 1.43ac pond will be drained causing a 0.02 ac take of the 0.09 ac Wetland bwt. 64 lf of permanent impacts will result from the realignment of a UT to Hickory Creek, Stream 5-8, into a new 60" RCP

Permit Site 20: 235 lf of permanent impacts will result from the realignment of a UT to Hickory Creek, Stream 5-3, into a new 66" RCP with 27 lf of bank stabilization at the outlet of the new pipe.

Permit Site 21: 211 lf of permanent impacts will result from the realignment of a UT to Hickory Creek, Stream 5-11, into a new 54" RCP with 23 lf of bank stabilization at the outlet of the new pipe. Roadway fill, excavation and mechanized clearing will result in a take of 0.08 ac of the 1.56 ac Wetland bqa.

Permit Site 22: 177 lf of permanent impacts will result from the realignment of a UT to King's Reservoir, Stream 6-3, into a new 54" RCP with bank stabilization totaling 40 lf at both ends of the new pipe.

FEDERALLY PROTECTED SPECIES

As of April 2, 2015, the USFWS lists two federally protected species for Cleveland County. The only change since the 2012 permit application is the northern long-eared bat (*Myotis septentrionalis*) was added to the list for Cleveland County. A memo was sent to USFWS on June 15, 2016 indicating that NCDOT is in compliance with 4(d) requirements. An Amended Biological Opinion issued November 9, 2012 from the USFWS continued the call of Not Likely to Jeopardize the Continued Existence of the Dwarf-flower Heartleaf from the 2004 Opinion. Section 7 has been satisfied for this project.

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

R-2707C Avoidance and Minimization:

NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. In addition to all of the measures listed in the 2014 phased permit application, other specific examples of avoidance and minimization measures include:

- 2:1 slopes will be used in fill areas to reduce impacts to surrounding wetlands and jurisdictional streams.
- A Hazardous Spill Basin will be installed near the First Broad River to help protect Critical Area for Shelby's water intake.
- No deck drains will be used on the First Broad River Bridges.
- Drop structures will be installed in pipe where necessary to reduce outlet velocities.
- A Dry Detention basin will be utilized at station 599+50 -L- Right. This basin will serve to attenuate peak stormwater flows, promote settlement of suspended solids and reduce erosive velocities downstream.

Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. R-2707 C will permanently impact 0.94 acre of wetlands, 7,644 linear feet of streams (7,126 linear feet of permanent fill and 518 linear feet of bank stabilization), and temporarily impact 0.10 acre of streams.

The Division of Mitigation Services will provide compensatory mitigation for 0.94 acre of wetlands impacts and 7,126 linear feet of stream impacts from R-2707C.

REGULATORY APPROVALS

Section 404: Application is hereby made for a modification to the USACE Individual 404 Permit as required for the above-described activities.

Section 401: We are hereby requesting a modification to the 401 Water Quality Certification from the N. C. Division of Water Resources.

A copy of this application and distribution list will also be posted on the NCDOT website at: <http://connect.ncdot.gov/resources/Environmental>. If you have any questions or need additional information, please contact Jeff Hemphill at jhemphill@ncdot.gov or (919) 707-6108.

Sincerely,



for

Philip S. Harris III, P.E., C.P.M.
Natural Environment Section Head

cc:

NCDOT Permit Application Standard Distribution List

**U.S. ARMY CORPS OF ENGINEERS
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT**

33 CFR 325. The proponent agency is CECW-CO-R.

OMB APPROVAL NO. 0710-0003
EXPIRES: 28 FEBRUARY 2013

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
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(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME First - Philip Middle - S. Last - Harris Company - NCDOT-PDEA E-mail Address -		8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Middle - Last - Company - E-mail Address -	
6. APPLICANT'S ADDRESS: Address- 1548 Mail Service Center City - Raleigh State - NC Zip - 27699 Country -		9. AGENT'S ADDRESS: Address- City - State - Zip - Country -	
7. APPLICANT'S PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax 919-707-6111		10. AGENTS PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax	

STATEMENT OF AUTHORIZATION

11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

SIGNATURE OF APPLICANT

DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) R-2707C		
13. NAME OF WATERBODY, IF KNOWN (if applicable) First Broad River and Hickory Creek and their UTs		14. PROJECT STREET ADDRESS (if applicable) Address City - State - Zip -
15. LOCATION OF PROJECT Latitude: °N 35.32209 Longitude: °W -81.54982		
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID Municipality Section - Township - Range -		

17. DIRECTIONS TO THE SITE

Please see attached vicinity map and cover letter.

18. Nature of Activity (Description of project, include all features)

The North Carolina Department of Transportation (NCDOT) proposes to construct new location freeway bypass from 0.6 mile west of SR 1162 to SR 1001 in Cleveland County. The R-2707 project, approximately 19 miles in length, will be a four-lane divided highway with full control of access, primarily on new location (a bypass of the City of Shelby), with widening sections to the east and west of the new location section along existing US 74. Section R-2707C runs from just west of the First Broad River to just east of the NC 150 Interchange.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The primary purpose of R-2707 is to increase the capacity of the US 74 corridor, thereby improving levels of service, reducing the potential for future traffic congestion, and improving safety. Future traffic projections indicate that in the absence of improvements to the subject section of US 74, traffic conditions on this highway would become unacceptably congested and increasingly unsafe; traffic delays on the existing facility would continue to mount, as would the accident rate, some of which already exceed statewide rates for like facilities. The project will also provide a key economic development corridor between three major North Carolina cities: Asheville (via I-26), Charlotte, and Wilmington. The proposed project would increase mobility for commuters, commercial traffic, and other local and regional users. Increased mobility would lower operating costs for businesses relying on US 74 for the transport of goods and services, allowing the businesses to grow and thereby expand options for employment and place of residence for many commuters by lowering travel times; and enhance the use of other modes of transportation.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Impacts will result from widening the roadway and shoulders, construction of roadway on new location, and bridge construction.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
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See attached cover letter.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres See attached cover letter.

or

Linear Feet See attached cover letter.

23. Description of Avoidance, Minimization, and Compensation (see instructions)

See attached cover letter.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See attached permit drawings.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

 01-11-2017
for PHILIP S. HARRIS III SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.



PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

December 16, 2016

Mr. Philip S. Harris, III, P.E., CPM
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

R-2707C, Shelby Bypass from West of NC 226 to West of NC 150, Cleveland County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information supplied by you on December 13, 2016, the impacts are located in CU 03050105 of the Broad River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Broad 03050105 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	7,126.0	0.94	0	0	0	0

*Some of the stream and/or wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

DMS commits to implementing sufficient compensatory stream and wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
Credit Management Supervisor

cc: Mr. Steve Kichefski, USACE – Asheville Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: R-2707C

Subject: Draft Minutes from Interagency Permit Review Meeting
on September 8, 2003 for R-2707C in Cleveland County

Team Members:

Steve Lund-COE	(present)
Cynthia Van Der Wiele-NCDWQ	(present)
Marla Chambers-NCWRC	(present)
Marella Buncick-USFWS	(present)
Chris Militscher-EPA	(absent)

Participants:

Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
Frank Fleming, Sungate Design
Josh Dalton, Sungate Design
Tim Bassette-PDEA
Jennifer Harris-PDEA
Charles Hunt-Structures Design
Doug – Design Services

Sheet 5

Sungate Design (SG) – Overview (interchange) Hazardous spill basin (HSB)

Cynthia-I want to see a Typical

Marshall Clawson (MWC) – Gore area, the fill slope from the ramp and the fill slope from –L- come together to create a suitable area for a HSB. Will show it on the plans and permit drawings

Cynthia-Does it meet design criteria? Capacity

MWC – Yes

Marla – Why a HSB?

SG – Within 0.5 miles of a critical area

Sheet 6

SG – Overview

Steve – Bridge spans out of the creek?

Cynthia – Treatment of deck drains.

SG – No direct discharge into the stream. Also the water is treated in another HSB at the bridge.

Steve – Spans out of the water.

SG – No, we will investigate lengthening the center span to minimize impacts to the stream.

DOT – This was investigated and the max the center span can be is 130' so, you now have [1@65](#), [1@130](#), [1@65](#)' – March –2005

If we went with the 130' span the banks around the pier will scour as one of the bents would end up on the back of the stream – Return to the original design of [3@85](#) –April 2005

Marla – What about a work bridge?

MWC – We will be using work pads to install the drilled shafts.

Marrella – HSB, do they need maintained?

MWC- There will be a maintenance commitment for the HSB.

Marla – HSB, underwater?

SG – Yes, approximately the less than the 10 yr event

Sheet 10

SG – Overview

Marla – Is the pipe length minimized here?

SG – Yes, 2:1 side slopes to minimize impacts and shorten the cross pipe

Tim – Protected Plant area stay out of these areas.

Marella- These areas within the construction limits have been accounted for. If you work outside the construction limits, these areas, must be accounted for also.

Sheet 11

SG-Overview, stream JD just downstream of the pond, small amount of wetlands around pond also

Marella – Mitigation for Ponds?

Tim - No, surface water impacts only

MWC- These impacts will be shown on the summary

Marrella - Is the stormwater treated?

SG – Yes

Sheet 12

SG – RCBC, JD, No wetlands

Marrella – We need baffles in this culvert for sinuosity.

Tim – Will check on the stream survey

Sheet 14

SG – Overview, No JD and No Wetlands.

Steve – This is a JD stream.

SG – We will look into it and double check the EA

Sheet 17

SG – Overview, Proposed Mitigation Site, stream restoration

Tim- Looking into it to see if its feasible.

MWC - If it's feasible then an onsite meeting with all the agencies will be scheduled.

SG – Geotech needs to look at this also.

MWC – Yes, we don't need to be blasting in a natural stream design.

Sheet 19

SG – Overview

Marla – Stable in-between the pipes?

SG – Will look in to it for stability

Cynthia – Check for velocities

SG – OK

Marla – Placement of Ramps

Doug – Future Design Capacity for the interchange

Steve – Wetlands are a whole take

Sheet 20

SG – Overview 2 JD and 2@ 8x7 with sills

Marella-Baffles are needed and maybe some realignment. Need to maintain passage

SG – Will investigate

Marla – Need to stabilize the banks

SG – Will investigate

Sheet 21

SG – Overview

SG – JD, both upstream and downstream.

Tim-Wetland Boundary symbology incorrect

SG – Needs to account for surface water impacts only

Sheet 22

Steve - Wetlands are not a total take

Sheet 25

SG - Overview

Steve – Avoid wetlands

Sheet 29

SG – JD from just inside the fill slope – HSB site

Sheet 42

SG –Overview

Steve – 48” intermittent

**Minutes from the Interagency 4C Hydraulic Design Review Meeting
R-2707C - Cleveland County
September 21, 2016**

Team Members:

Steve Kichefski, USACE	(present)
Marella Buncick, USFWS	(present)
Donna Hood, NCDWR	(present)
Marla Chambers, NCWRC	(present)
Dr. Cynthia Van Der Wiele, USEPA	(not present)
Felix Davila, FHWA	(not present)

Participants:

Bill Zerman, Hydraulics
Matthew York, Hydraulics
Trish Beam, Division 12 Environmental
Josh Dalton, Sungate Design Group
Brian Elam, Sungate Design Group
Kanchana Noland, Roadway Design
Jeremy Goodwin, REU
Jeff Hemphill, NES
Kevin Fischer, Structures
James Swinson, Utilities
Jeb Smith, Utilities
Wilson Stroud, PDEA
Larry Carpenter, Div. Const. Eng. (Not Present)

Minutes:

Introductions were made by all in attendance.

Josh Dalton proceeded through the permit drawing plan sheets:

General

Discussed waiving the burial requirement for steep cross pipes conveying jurisdictional streams or using a pipe sill or cross vane for grade control. It was decided that cross pipes with slopes greater than 4% should not be buried and will be exempt from the burial requirement. Cross pipes will be resized if they are exempt from burial requirement.

Permit Sheet 4:

Site 1: The need for a temporary work bridge/causeway is not anticipated; however Temporary Impacts, between the bridge spans, will be shown to accommodate unforeseen bridge construction related activities.

Donna Hood asked if we knew the soils in area of proposed hazardous spill basin and if HSB will require a liner.

The hydraulics unit has reviewed the soil maps in the area and found that soils are Chewala loam and that there is a potential for a water table depth of 0.5 to 2 feet below the surface. After conferring with storm water and roadside environmental groups, concerning what action should be taken, it was decided that an impermeable liner should be placed along the base of the HSB along with Class II rip rap. A detail of the basin will be provided in the plans.

Permit Sheet 7:

Site 2: The pipe outlets approximately 30ft upstream of a 65 degree bend in the channel. Stream stability lead to discussion regarding realigning the 66" pipe outlet and possibly adding a drop structure to reduce outlet velocity. Realigning the pipe would require additional ROW, and since the purchase of parcel 10 has already been settled, the pipe is to be left at its current alignment unless there is strong objection. A drop structure will be added to the cross pipe to reduce outlet velocity. Pipe is not to be buried if slope remains over 4%.

Permit Sheet 10:

Site 3: Drop structure to be added to 42" cross pipe to reduce outlet velocity. Pipe is not to be buried if slope remains over 4%.

Permit Sheet 12:

Site 4: Review 72" pipe outlet velocities and evaluate whether adding a drop structure is warranted.

Pipe outlet velocity for the 10yr event is 19.9 ft/s. To reduce velocity, a drop structure will be added to the pipe.

Permit Sheet 15:

Site 5: Review 66" pipe outlet velocities and evaluate whether adding a drop structure is warranted.

Pipe outlet velocity for the 10yr event is 21.4 ft/s. To reduce velocity, a drop structure will be added to the pipe.

Site 6: Upon draining of the pond, area inside Right of Way is to be seeded as a wetland with native grasses, and the remainder of area inside TDE is to be stabilized with regular approved seed and mulch.

Include a site meeting requirement in the permit to review condition of pond after draining.

Erosion control measures are to be allowed in jurisdictional stream at this site to control pond sediment.

Permit Sheet 20:

Site 7: No comments

Permit Sheet 25:

Site 8: What is the slope of the 48" cross pipe? Review velocities and consider adding drop box and exempt from burial.

The pipe slope is 3.9% and velocity for the 10yr event is 15.8 ft/s. To reduce velocity, a drop structure will be added to the pipe.

Permit Sheet 28:

Site 9: No Comments

Permit Sheet 30:

Site 10: What is the slope of the 66" cross pipe? Review velocities and consider adding drop box and exempt from burial.

The pipe slope is 2.6% and velocity for the 10yr event is 17.2 ft/s. To reduce velocity, the proposed JB w/ Slab Lid will be used as a drop structure.

Site 11: What is the slope of the 54" cross pipe? Review velocities and consider adding drop box and exempt from burial.

The pipe slope is 2.3% and velocity for the 10yr event is 14.5 ft/s. To reduce velocity, a drop structure will be added to the pipe.

Marella expressed concerns about channel stability where ditch intersects with outlet channel. Rip rap outlet protection to be reviewed and lengthened if necessary.

Permit Sheet 33:

Site 12: Concerns with steep slope and outlet velocity of 36" pipe into wetland discussed. To eliminate erosive velocities in wetland, 36" pipe to be tied directly to 54" cross pipe with junction box. If possible, junction box will serve as drop structure for 54" to reduce slope.

Site 13: Natural stream design discussed for channel relocation. A 2005 geotech report indicated that natural channel design was likely not feasible due to rock in the area. Step pool design with log cross vanes to be investigated as alternative.

After the meeting, Leilani Paugh, from the On-Site mitigation group, was asked to look into the channel relocation. Leilani said "There are several reasons we didn't

recommend onsite mitigation for this reach. The right of way is very limited. It is only 80 feet at the widest point between the proposed roadway fill and the adjoining road (Spring Brook Drive). Geotech found several areas of rock near the surface in this area. Full channel restoration with a riparian buffer reforestation would be hard to achieve, and even harder to meet success criteria.” Based on Leilani’s input, natural stream design will no longer be pursued.

Channel relocation outlet to be realigned to better tie with existing jurisdictional stream.

Area around channel relocation to be reforested (Type I & II) to C/A line.

Permit Sheet 36:

Site 14: What is slope of 72” pipe?

The pipe slope is 2.75%.

No further comments.

Permit Sheet 39:

Site 15: What is slope of 36” pipe?

The pipe slope is 3.6%.

Provide blow up of site.

Site 16: Provide blow up of site.

Site 17: Provide blow up of site.

Permit Sheet 44:

Site 18: Proposed channel relocations discussed. Steve (USACE) indicated that additional stream impacts associated with the VE design would need to be justified. Marella (USFWS) had concerns with stability of proposed channels due to sandy soils in the area. After further discussion, it was decided that original box culvert and pipe design is the best option. Tying the pipe into the culvert will be investigated for better downstream channel geometry.

Permit Sheet 47:

Site 19: No Comments.

Permit Sheet 53:

Site 20: Outlet rip rap to be extended for better stability at ditch tie in.

Permit Sheet 56:

Site 21: Outlet rip rap to be extended for better stability at ditch tie in.

Permit Sheet 59:

Site 22: To reduce pipe outlet velocity and better protect banks of jurisdictional stream, 15" slope drain material to be specified CSP and outlet pad upgraded to class 'T' rip rap.

Meeting adjourned.

HYDRAULIC DESIGN (4c) / PERMIT DRAWINGS REVIEW

Location: Structures Conference Room, DOT Century Center

TIP NO: R-2707c DATE: 9.21.2016

NAME	AGENCY/ UNIT	PHONE	Email
Bill Zerman	NCDOT Hydraulics	919-707-6755	bzerman@ncdot.gov
Matt York	NCDOT Hydraulics	919-707-6765	mjyork@ncdot.gov
JOSH DALTON	SUNGATE	919.859.2243	jdalton@sungatedesign.com
Jeremy Goodwin	NCDOT - Roadside Univ	919-707-2942	jagoodwin@ncdot.gov
Brian Elam	Sungate	919-859-2243	belam@sungatedesign.com
Steve Kichefski	USACE	828-271-7980	steven.L.Kichefski@usace.army.mil
Donna Hood	NC DWR	704.682.2839	donna.hood@ncdwr.gov
Trish Bean	DOT-Division 12 Environmental	704-480-9044	p.d.beam@ncdot.gov
Marla Chambers	NCWRC	704-984-1070	marla.chambers@ncwrlife.org
Marelle Bunick	USFWS	828-259 3939 x 237	marelle-bunick@fws.gov
JBFF HEMPHIN	NCDOT N24	919 707-6126	jhemphill@ncdot.gov
JAMES	UTILITIES	919-707-6987	JESWINSON@NCDOT.GOV
JEB SMITH	UTILITIES		JSSMITH8@NCDOT.GOV



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.06; Released June 2016)

WBS Element: 34497.1.2 TIP No.: R-2707C County(ies): Cleveland Page 1 of 4

General Project Information

WBS Element:	34497.1.2	TIP Number:	R-2707C	Project Type:	New Location	Date:	11/11/2016
NCDOT Contact:	Bill Zerman, PE			Contractor / Designer:	Sungate Design Group		
Address:	Hydraulics Unit 1590 Mail Service Center Raleigh, NC 27699-1590			Address:	915 Jones Franklin Rd Raleigh NC 270603		
	Phone: (919) 707-6755				Phone: (919) 859-2243		
	Email: bzerman@ncdot.gov				Email: belam@sungatedesign.com		
City/Town:	Shelby			County(ies):	Cleveland		
River Basin(s):	Broad			CAMA County?	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	4.792 Miles	Surrounding Land Use:	Residential, Agricultural, Rural		
	Proposed Project		Existing Site		
Project Built-Up Area (ac.)	74.7 ac.		19.8 ac.		
Typical Cross Section Description:	Two 12ft lanes with 12ft outside shoulders (10ft paved) and 6ft inside shoulders (4ft paved) in each direction with a 34ft grassed median.		N/A		
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 35,110	Year: 2037	Existing: 21,010	Year: 2017	
General Project Narrative: (Description of Minimization of Water Quality Impacts)	US 74 Shelby bypass from East of NC 226 to East of NC 150: Measures have been taken throughout the project to limit impacts to wetlands and surface waters. A Hazardous Spill Basin will be utilized for -L- line roadway runoff that discharges within 1/2 mile of the First Broad River's Critical Area. The Critical Area is associated with the City of Shelby's raw water intake, and the Hazardous Spill Basin will be used to protect surface water quality by temporarily detaining hazardous materials accidentally released on roadway facilities. Further, no deck drains will be used on the First Broad River bridge, eliminating potential for direct roadway runoff into surface waters. A Dry Detention basin will be utilized at approximate station 599+50 -L- Right. This basin will serve to attenuate peak stormwater flows, promote settlement of suspended solids and reduce erosive velocities downstream. 2:1 slopes will be used in fill areas to reduce impacts to surrounding wetlands and jurisdictional streams.				

Waterbody Information

Surface Water Body (1):	First Broad River		NCDWR Stream Index No.:	9-50-(19.5)	
NCDWR Surface Water Classification for Water Body	Primary Classification:	Water Supply IV (WS-IV)			
	Supplemental Classification:	None			
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Comments:				
NRTR Stream ID:				Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	Yes	Deck Drains Discharge Over Buffer?	No	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

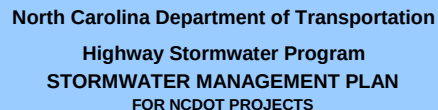
(Version 2.06; Released June 2016)

WBS Element:	34497.1.2	TIP No.:	R-2707C	County(ies):	Cleveland	Page	2	of	4
Additional Waterbody Information									
Surface Water Body (2):	Williams Creek			NCDWR Stream Index No.:	9-50-26				
NCDWR Surface Water Classification for Water Body	Primary Classification:			Water Supply IV (WS-IV)					
	Supplemental Classification:			None					
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	Comments:								
NRTR Stream ID:				Buffer Rules in Effect:					
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?		N/A			
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)				
(If yes, provide justification in the General Project Narrative)									
Surface Water Body (3):	Hickory Creek			NCDWR Stream Index No.:	9-50-30				
NCDWR Surface Water Classification for Water Body	Primary Classification:			Class C					
	Supplemental Classification:			None					
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	Comments:								
NRTR Stream ID:				Buffer Rules in Effect:					
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?		N/A			
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)				
(If yes, provide justification in the General Project Narrative)									
Surface Water Body (4):	Buffalo Creek			NCDWR Stream Index No.:	9-53-(2.9)				
NCDWR Surface Water Classification for Water Body	Primary Classification:			Water Supply III (WS-III)		CA			
	Supplemental Classification:								
Other Stream Classification:									
Impairments:	None								
Aquatic T&E Species?	Comments:								
NRTR Stream ID:				Buffer Rules in Effect:					
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?		N/A			
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)				
(If yes, provide justification in the General Project Narrative)									



Page 3 of 4

Additional Comments



TIP No.: R-2707C

County(ies): Cleveland

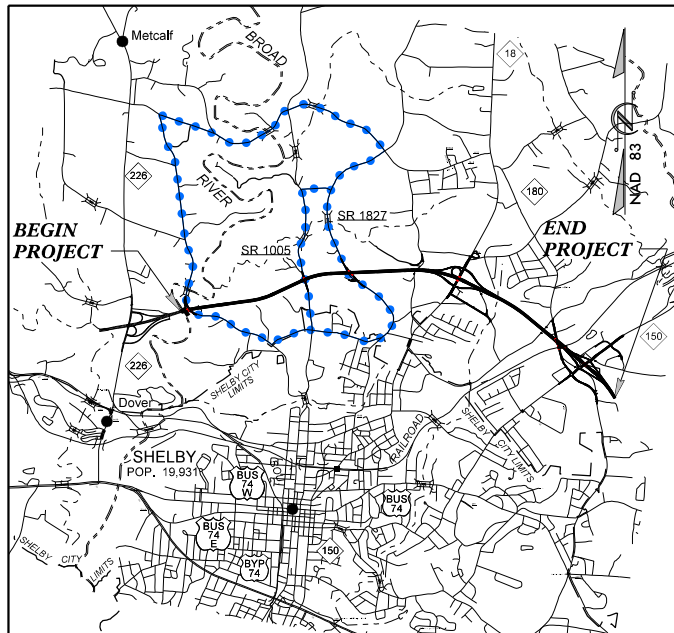
Page 4 of 4

Other Best Management Practices

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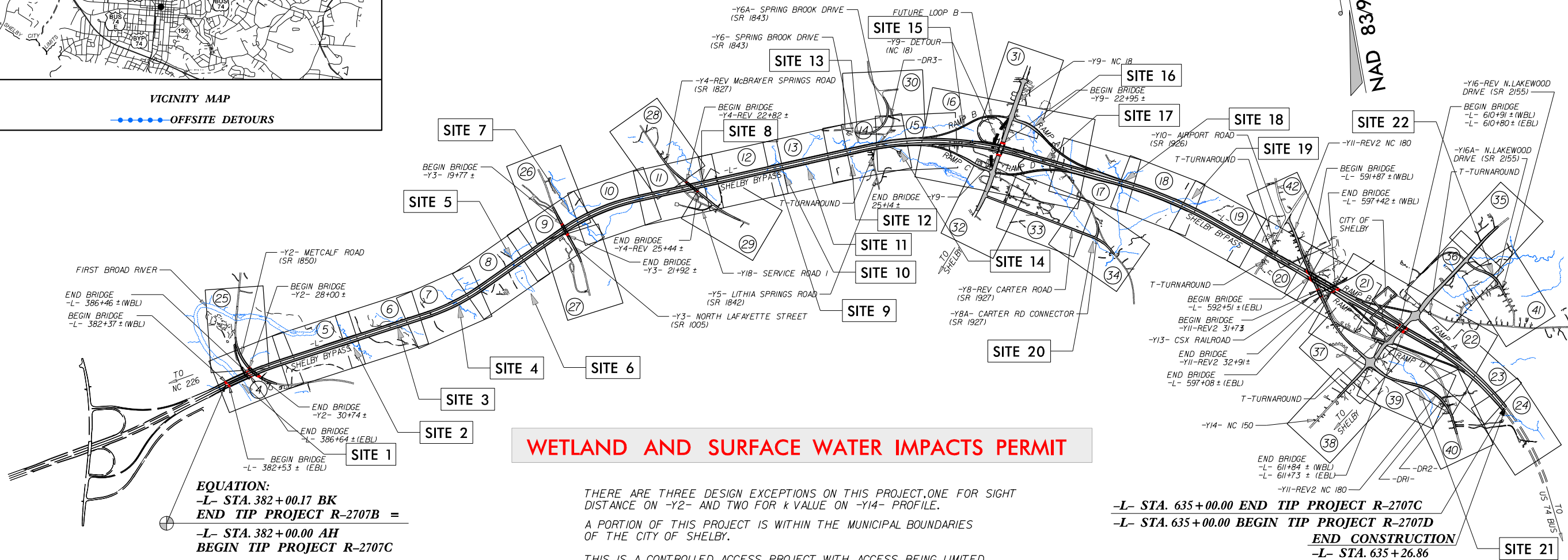
Additional Comments

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP

OFFSITE DETOURS



WETLAND AND SURFACE WATER IMPACTS PERMIT

EQUATION:
-L- STA. 382+00.17 BK
END TIP PROJECT R-2707B =
-L- STA. 382+00.00 AH
BEGIN TIP PROJECT R-2707C

THERE ARE THREE DESIGN EXCEPTIONS ON THIS PROJECT, ONE FOR SIGHT DISTANCE ON -Y2- AND TWO FOR k VALUE ON -Y14- PROFILE.

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF SHELBY.

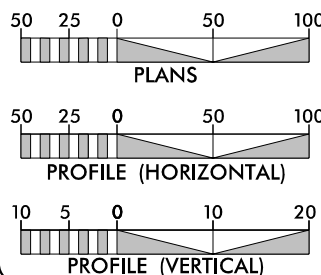
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO THE INTERCHANGES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

-L- STA. 635+00.00 END TIP PROJECT R-2707C
-L- STA. 635+00.00 BEGIN TIP PROJECT R-2707D
END CONSTRUCTION
-L- STA. 635+26.86

NCDOT CONTACT: REKHA PATEL, PE

GRAPHIC SCALES



DESIGN DATA

ADT 2017 = 21,010
ADT 2037 = 35,110
DHV = 11 %
D = 55 %
T = 14 % *
V = 70 MPH
FUNC CLASS = FREEWAY
(* TTST 9% DUAL 5%)
STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY STATE PROJECT R-2707C = 4.592 MILES
LENGTH OF STRUCTURES STATE PROJECT R-2707C = 0.200 MILES**
LENGTH OF STATE PROJECT R-2707C = 4.792 MILES
**NOTE : LENGTH BASED ON WBL BRIDGES

Prepared for NCDOT in the Office of:

moftatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
November 21, 2014

LETTING DATE:
May 16, 2017

TIM R. REID, P.E.
PROJECT ENGINEER

TRENT E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

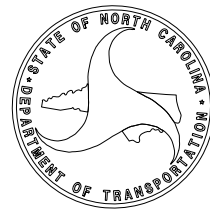
HYDRAULICS ENGINEER

SUNGATE DESIGN GROUP, P.A.
815 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SIGNATURE: _____ P.E.
ROADWAY DESIGN
ENGINEER

moftatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

SIGNATURE: _____ P.E.

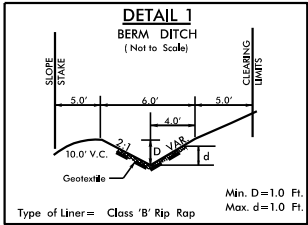


TIP PROJECT: R-2707C

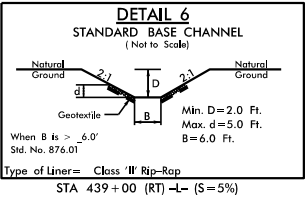
CONTRACT:

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	2D-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

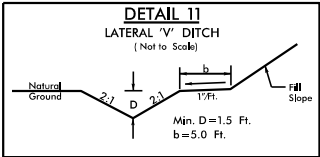
PERMIT DRAWING
SHEET 2 OF 68



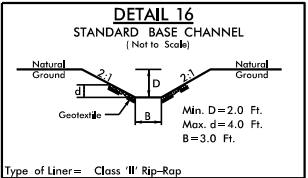
FROM STA. 443+50 TO STA. 449+00 (RT) -L- RT
FROM STA. 463+80 TO STA. 469+50 (LT) -L- LT
FROM STA. 471+00 TO STA. 475+00 (LT) -L- RT
FROM STA. 484+00 TO STA. 487+50 (LT) -L- RT
FROM STA. 572+50 TO STA. 576+00 (LT) -L- LT



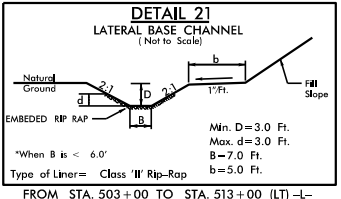
STA 439+00 (RT) -L- (S=5%)



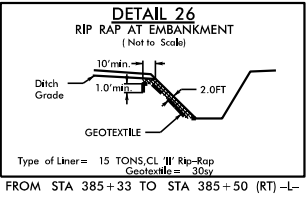
FROM STA 589+00 TO STA 589+70 (LT) -L-
FROM STA 25+50 TO STA 28+50 (RT) -Y4-REV
FROM STA 12+50 TO STA 17+10 (RT) -Y9RPA-



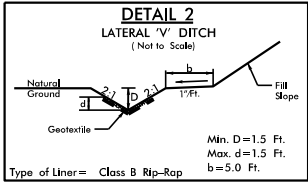
STA 495+75 (RT) -L- (S=1.3%)
STA 495+95 (LT) -L- (S=1.0%)
STA 537+00 (LT) -L- (S=2.2%)
STA 564+25 (RT) -L- (S=3.0%)
STA 567+80 (LT) -L- (S=1.6%)
STA 17+15 (RT) -Y9RPA- (S=2.5%)



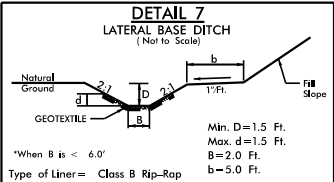
FROM STA. 503+00 TO STA. 513+00 (LT) -L-



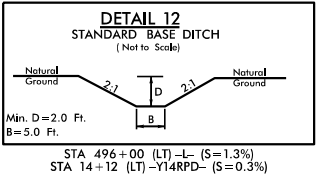
FROM STA 385+33 TO STA 385+50 (RT) -L-



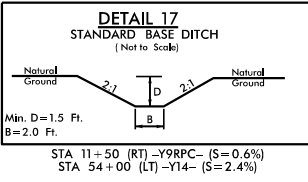
FROM STA 6+00 TO STA 8+30 (RT) -Y9RPA-
FROM STA 8+30 TO STA 12+00 (RT) -Y9RPA-
FROM STA 15+20 TO STA 17+00 (RT) -Y9-DETOUR



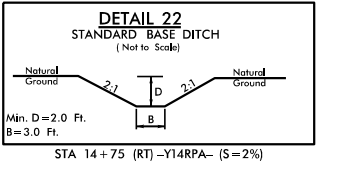
FROM STA 456+10 TO STA 457+75 (LT) -L-
FROM STA 488+50 TO STA 490+10 (RT) -L-
FROM STA 494+00 TO STA 496+00 (LT) -L-
FROM STA 584+50 TO STA 585+60 (RT) -L-
FROM STA 597+50 TO STA 598+75 (RT) -L-
FROM STA 601+15 TO STA 605+50 (RT) -L-
FROM STA 28+00 TO STA 31+75 (RT) -Y9-REV
FROM STA 11+60 TO STA 12+40 (RT) -DR1-



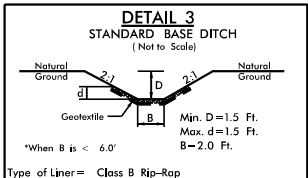
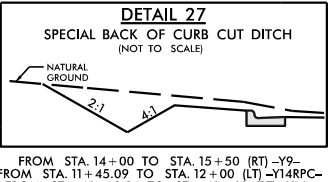
STA 496+00 (LT) -L- (S=1.3%)
STA 14+12 (LT) -Y14RPD- (S=0.3%)



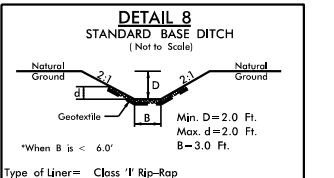
STA 11+50 (RT) -Y9RPC- (S=0.6%)
STA 54+00 (LT) -Y14- (S=2.4%)



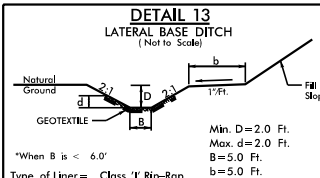
STA 14+75 (RT) -Y14RPA- (S=2%)



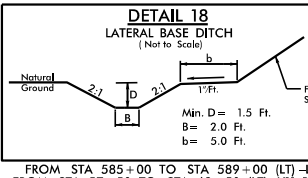
FROM STA 536+50 TO STA 537+43 (RT) -L- (S=8.8%)
STA 34+00 (LT) -Y11-REV2 (S=5.3%)



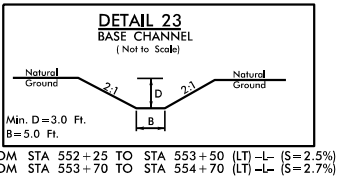
FROM STA 385+50 TO STA 385+73 (RT) -L- (S=2%)
STA 460+00 (RT) -L- (S=8%)
FROM STA 635+00 TO STA 635+56 (RT) -L- (S=3.6%)



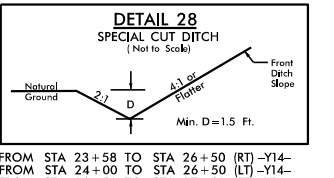
FROM STA 505+00 TO STA 508+25 (RT) -L-



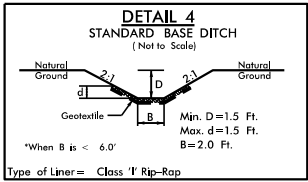
FROM STA 585+00 TO STA 589+00 (LT) -L-
FROM STA 57+50 TO STA 62+50 (LT) -Y11-REV2



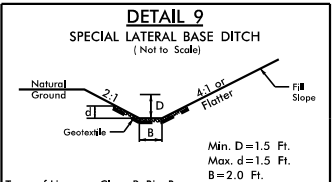
FROM STA 552+25 TO STA 553+50 (LT) -L- (S=2.5%)
FROM STA 553+70 TO STA 554+70 (LT) -L- (S=2.7%)



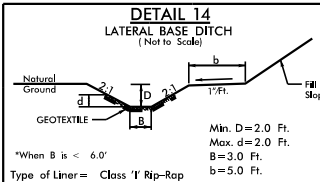
FROM STA 23+58 TO STA 26+50 (RT) -Y14-
FROM STA 24+00 TO STA 26+50 (LT) -Y14-
FROM STA 26+50 TO STA 27+60 (RT) -Y14-
FROM STA 48+00 TO STA 51+00 (LT) -Y14-
FROM STA 50+00 TO STA 55+00 (RT) -Y14-
FROM STA 51+50 TO STA 53+50 (LT) -Y14-



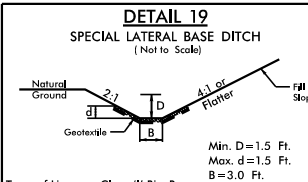
STA 490+00 (RT) -L- (S=10%)
STA 23+50 (RT) -Y14- (S=13%)



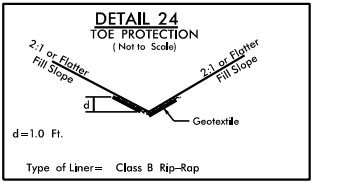
FROM STA 463+10 TO STA 464+50 (RT) -L-
FROM STA 487+50 TO STA 488+50 (RT) -L-
FROM STA 26+50 TO STA 28+00 (RT) -Y8-REV
FROM STA 27+60 TO STA 33+78.19 (RT) -Y14-
FROM STA 13+50 TO STA 13+62 (LT) -Y14RPB-



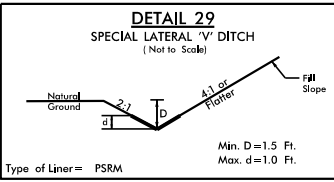
FROM STA 51+00 TO STA 59+20 (RT) -Y11-REV2



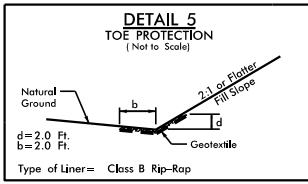
FROM STA. 49+00 TO STA. 51+00 (RT) -Y11-REV2



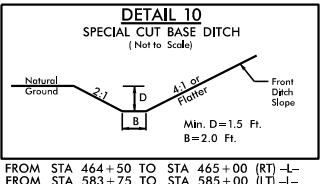
FROM STA 604+00 TO STA 607+50 (LT) -L-
FROM STA 604+00 TO STA 607+50 (RT) -L-



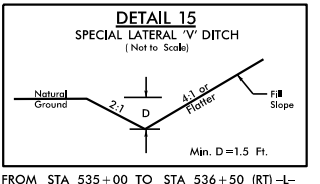
FROM STA 19+00 TO STA 20+70 (RT) -Y14-



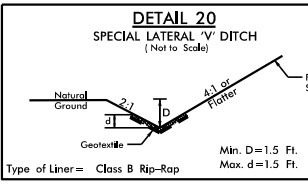
FROM STA 25+00 TO STA 28+00 (LT) -Y2-
FROM STA 402+50 TO STA 404+00 (LT) -L-
FROM STA 403+50 TO STA 407+00 (RT) -L-
FROM STA 405+00 TO STA 406+50 (LT) -L-
FROM STA 413+65 TO STA 416+00 (LT) -L-
FROM STA 425+50 TO STA 427+00 (RT) -L-
FROM STA 438+50 TO STA 439+20 (LT) -L-
FROM STA 451+50 TO CULVERT (RT) -L-
FROM STA 451+50 TO CULVERT (LT) -L-
FROM CULVERT TO STA 454+50 (LT) -L-
FROM STA 475+75 TO STA 476+50 (LT) -L-
FROM STA 488+50 TO STA 493+00 (LT) -L-
FROM STA 490+50 TO STA 492+00 (RT) -L-
FROM STA 495+00 TO STA 495+50 (RT) -L-
FROM STA 508+20 TO STA 513+00 (RT) -L-
FROM STA 564+00 TO STA 567+70 (LT) -L-
FROM STA 567+95 TO STA 568+70 (LT) -L-
FROM STA 15+40 TO STA 18+50 (LT) -Y9RPA-
FROM STA 11+00 TO STA 15+50 (LT) -Y9RPD-
FROM STA 19+70 TO STA 20+50 (LT) -Y14-
FROM STA 14+00 TO STA 14+85 (LT) -Y16-REV



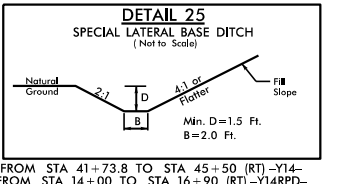
FROM STA 464+50 TO STA 465+00 (RT) -L-
FROM STA 583+75 TO STA 585+00 (LT) -L-
FROM STA 605+50 TO STA 607+50 (RT) -L-



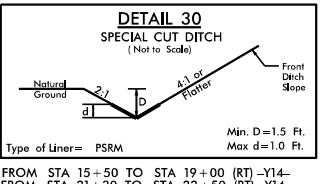
FROM STA 535+00 TO STA 536+50 (RT) -L-
FROM STA 537+25 TO STA 542+74 (LT) -L-
FROM STA 616+00 TO STA 617+00 (LT) -L-
FROM STA 619+50 TO STA 621+50 (RT) -L-
FROM STA 15+00 TO STA 21+40 (RT) -Y4-REV
FROM STA 9+50 TO STA 11+50 (RT) -Y9RPD-
FROM STA 29+30 TO STA 30+50 (RT) -Y4-REV
FROM STA 32+00 TO STA 33+00 (LT) -Y8-REV
FROM STA 22+00 TO STA 26+00 (RT) -Y11-REV2
FROM STA 21+90 TO STA 31+50 (RT) -Y11-REV2
FROM STA 34+00 TO STA 40+00 (LT) -Y11-REV2
FROM STA 33+20 TO STA 38+00 (RT) -Y11-REV2
FROM STA 46+00 TO STA 47+37 (LT) -Y11-REV2
FROM STA 46+00 TO STA 47+50 (RT) -Y11-REV2
FROM STA 65+00 TO STA 70+00 (LT) -Y11-REV2
FROM STA 54+00 TO STA 55+00 (LT) -Y14-
FROM STA 12+50 TO STA 13+50 (LT) -Y14RPB-
FROM STA 9+00 TO STA 14+00 (RT) -Y14RPD-
FROM STA 9+00 TO STA 14+00 (LT) -Y14RPD-
FROM STA 14+00 TO STA 14+80 (RT) -Y16A-
FROM STA 13+65 TOP STA 15+50 (LT) -SR2-
FROM STA 13+80 TO STA 15+00 (RT) -SR2-
FROM STA 13+00 TO STA 16+20 (LT) -Y9-DETOUR
FROM STA 17+00 TO STA 22+50 (RT) -Y9-DETOUR
FROM STA 18+75 TO STA 22+00 (LT) -Y9-DETOUR



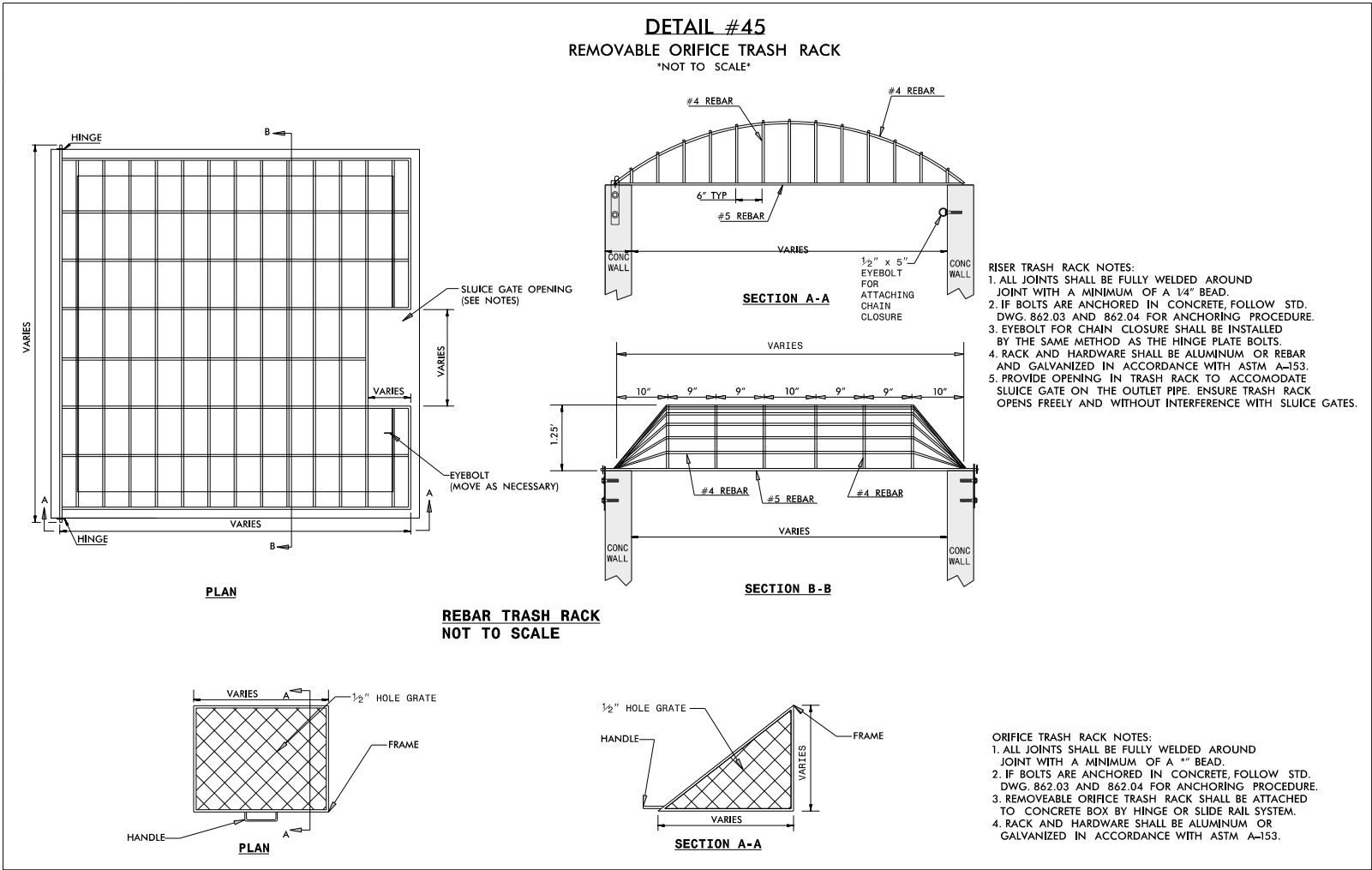
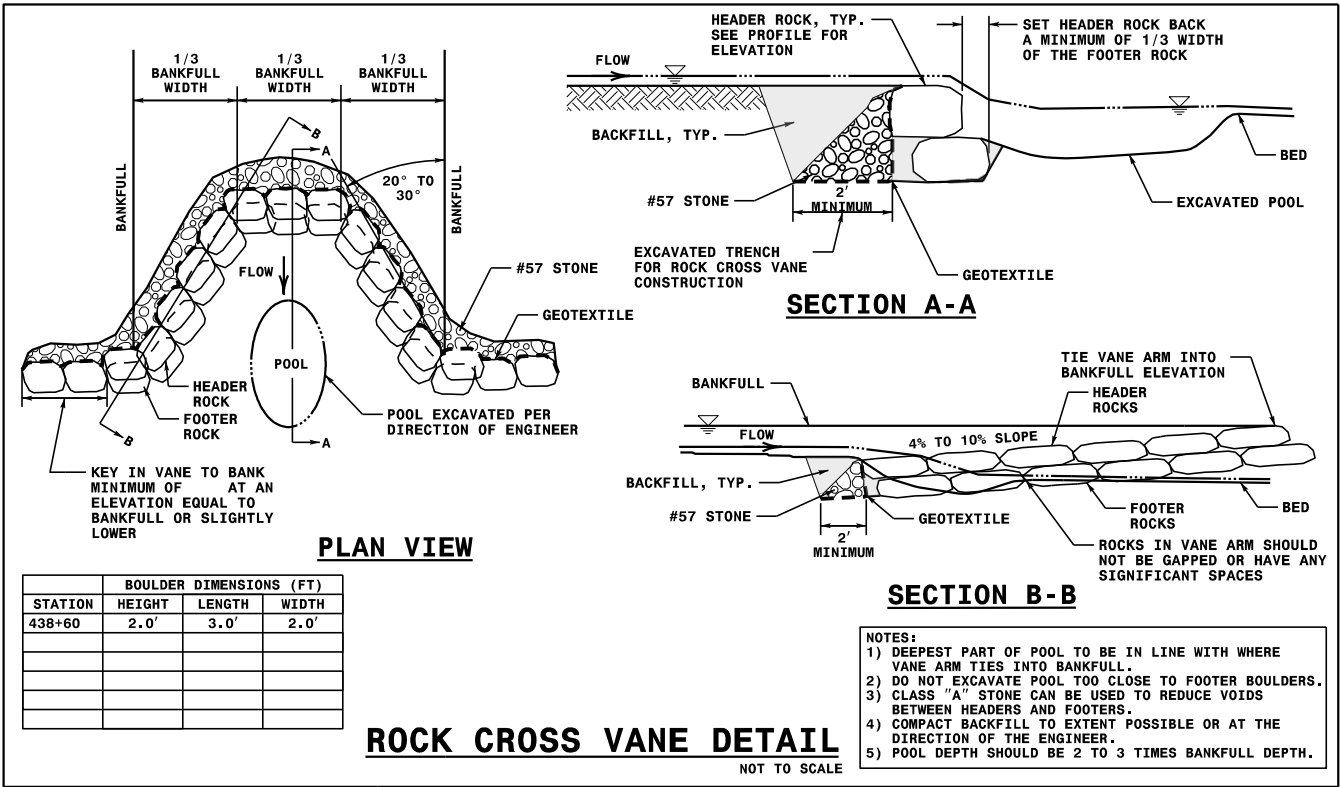
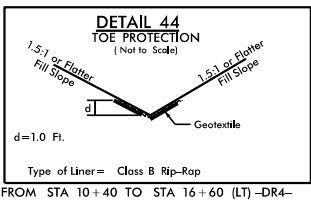
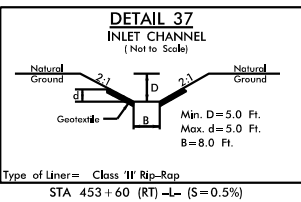
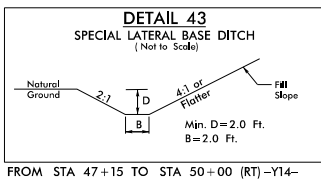
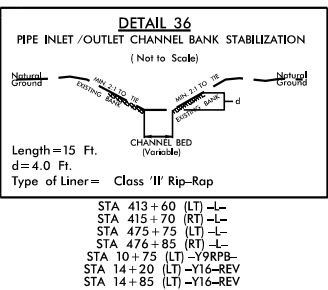
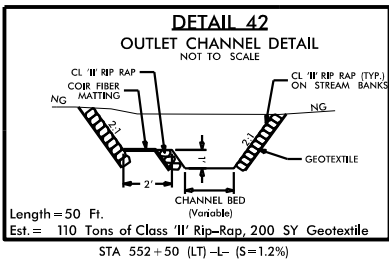
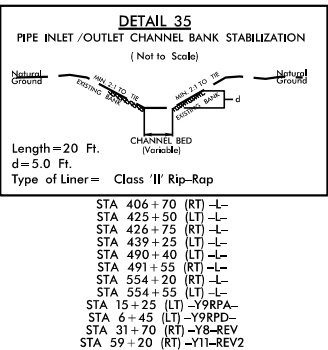
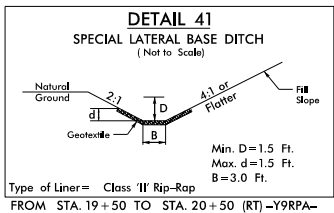
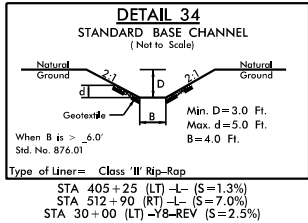
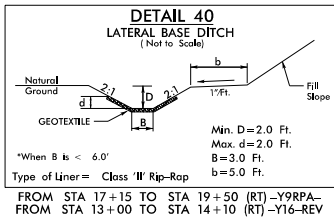
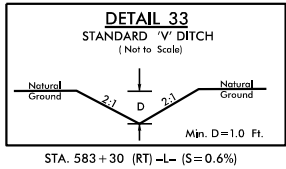
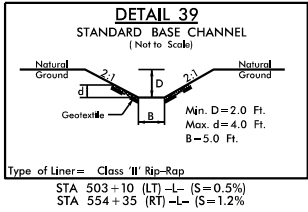
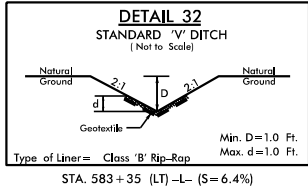
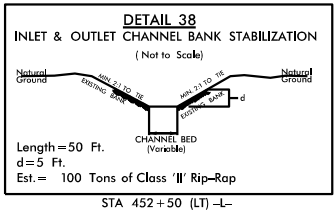
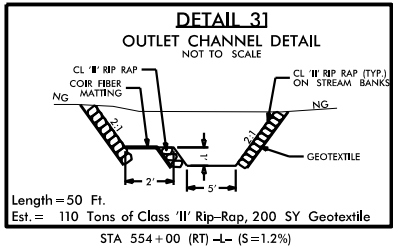
FROM STA 578+50 TO STA 579+50 (RT) -L-
FROM STA 607+50 TO STA 608+70 (LT) -L-
FROM STA 615+50 TO STA 616+00 (LT) -L-
FROM STA 33+00 TO STA 35+80 (LT) -Y8-REV
FROM STA 35+00 TO STA 35+87.81 (LT) -Y14-
FROM STA 35+35 TO STA 36+50 (RT) -Y14-
FROM STA 13+00 TO STA 15+47 (LT) -Y14RPA-
FROM STA 10+50 TO STA 13+00 (RT) -Y14RPB-



FROM STA 41+73.8 TO STA 45+50 (RT) -Y14-
FROM STA 14+00 TO STA 16+90 (RT) -Y14RPD-



FROM STA 15+50 TO STA 19+00 (RT) -Y14-
FROM STA 21+30 TO STA 22+50 (RT) -Y14-



NOT TO SCALE



TRASH RACK NOT SHOWN FOR CLARITY

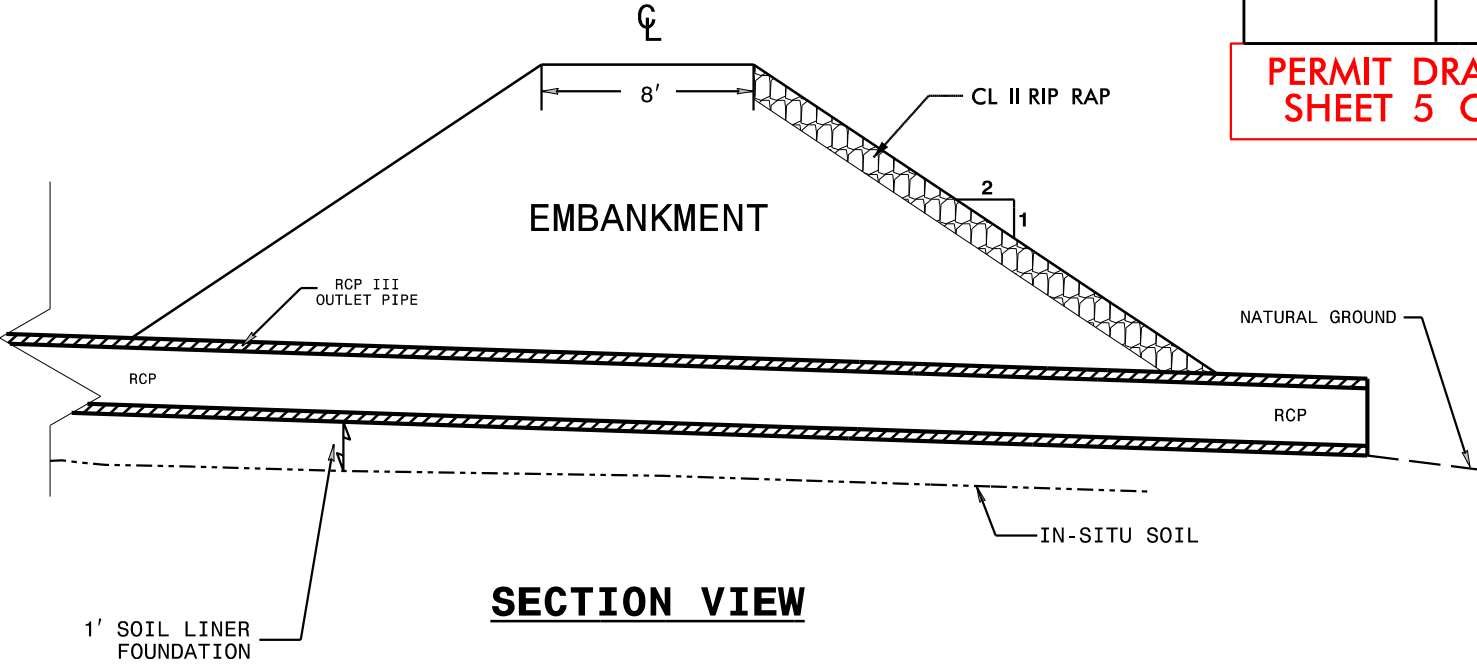
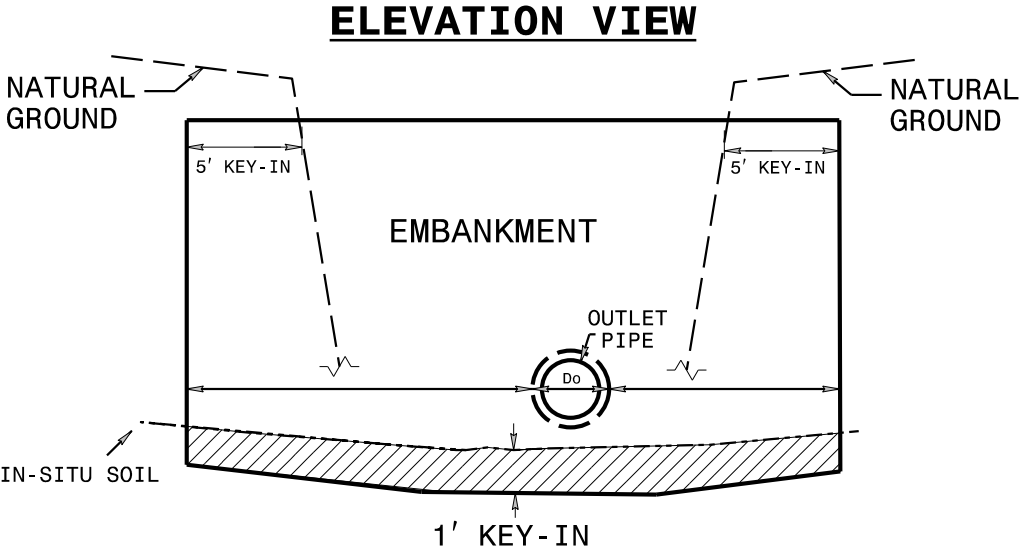
- ### SIDE 3

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE											
STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
586 + 97 ←- RT	2012	6"	18"	935.0	938.0	3.0'	933.0	5.0' X 5.0' X 5.0'	2"	935.0	24"
600 + 50 ←- RT	2113	6"	18"	925.0	929.0	4.0'	923.0	5.0' X 5.0' X 6.0'	2"	925.0	24"

DETAIL #47
HAZARDOUS SPILL BASIN EMBANKMENT AND LINER
(NOT TO SCALE)

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	2D-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 5 OF 68

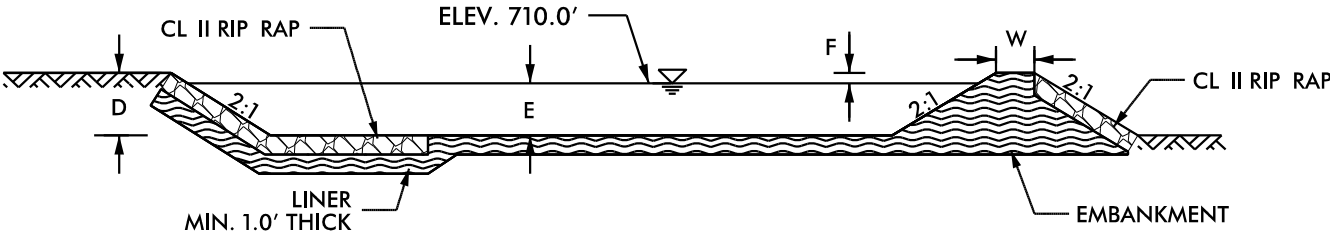


- EMBANKMENT NOTES**
- EMBANKMENT TO CONSIST OF A-5, A-6 OR A-7 NATURAL SOILS.
 - KEY IN EMBANKMENT A MINIMUM OF 1' INTO IN-SITU SOIL FOUNDATION.

- LINER FOR BASIN BOTTOM**
- LINER TO CONSIST OF A-5, A-6 OR A-7 NATURAL SOILS.
 - LINER MINIMUM 1.0 THICK.

- GENERAL NOTES**
- COMPACT BASIN EMBANKMENT AND LINER ACCORDING TO SECTION 235 OF STANDARD SPECS.

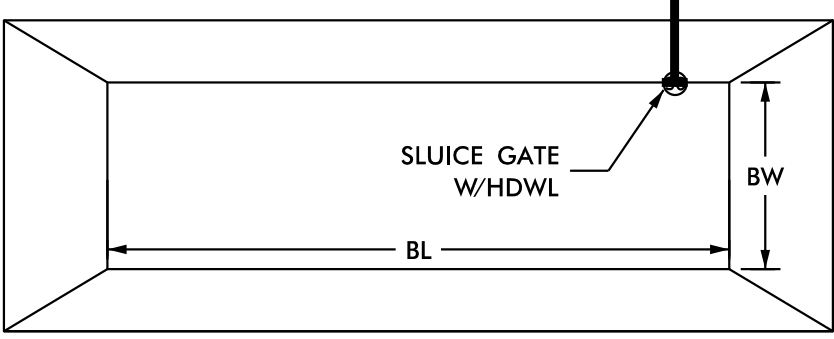
TOTAL CAPACITY REQUIRED: 516 CY
TOTAL CAPACITY PROVIDED: 517 CY
@ ELEV. 710.0 w/1.0 FT. FREEBOARD



DIMENSIONS

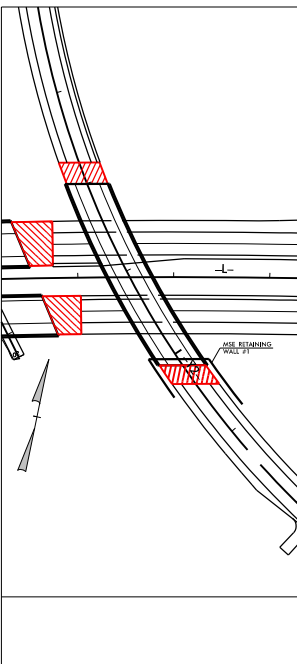
BASIN NO.	PROJECT STATION	DEPTH (D)	BERM WIDTH (W)	BERM ELEV.	BOTTOM LENGTH (BL)	BOTTOM WIDTH (BW)	BOTTOM ELEV.	DESIGN DEPTH (E)	FREE-BOARD (F)
1	-L- 386+00 (RT)	4.0'	8.0'	711.0'	113'	33'	707.0'	3.0'	1.0'

- NOTES:**
- SHAPE OF BASIN MAY VARY DEPENDING ON SITE CONSTRAINTS.
 - ACCESS BERM SHOULD BE PROVIDED FOR MAINTENANCE.
 - RIP-RAP EXTENDS 20' BEYOND PIPE AT BASIN INLET(SEE PLANS)
 - MINIMUM SLOPE OF THE BOTTOM OF THE BASIN SHOULD BE 0.3%.

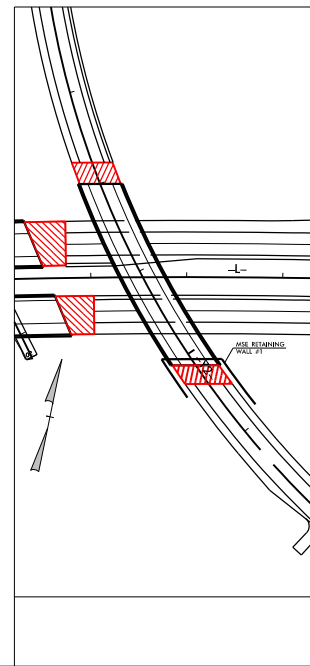


MODEL 20-10C SLUICE GATE

PROJECT REFERENCE NO.	SHEET NO.
<i>R-2707C</i>	<i>4</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



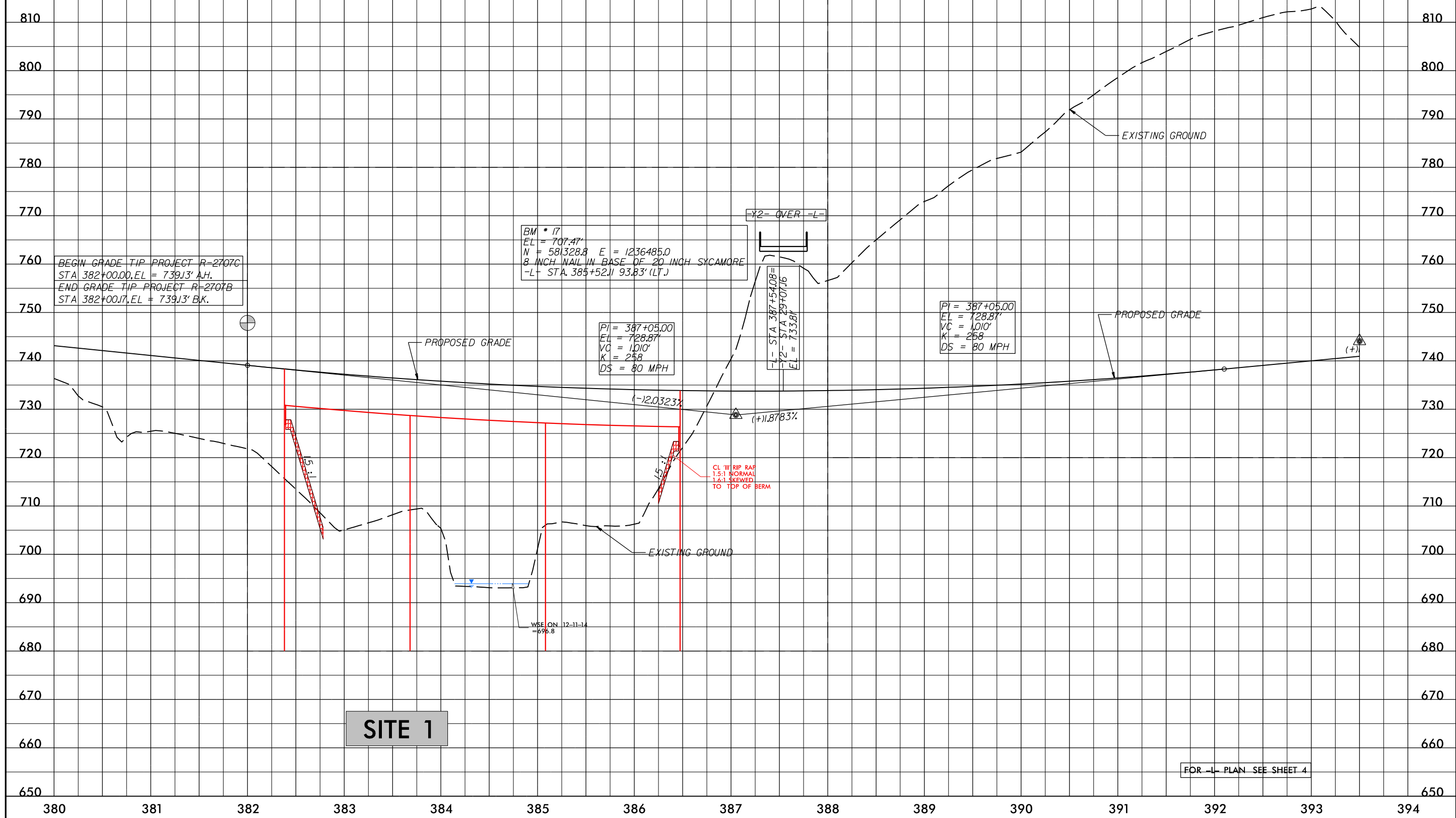
PROJECT REFERENCE NO.	SHEET NO.
<i>R-2707C</i>	<i>4</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PERMIT DRAWING
SHEET 8 OF 68

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

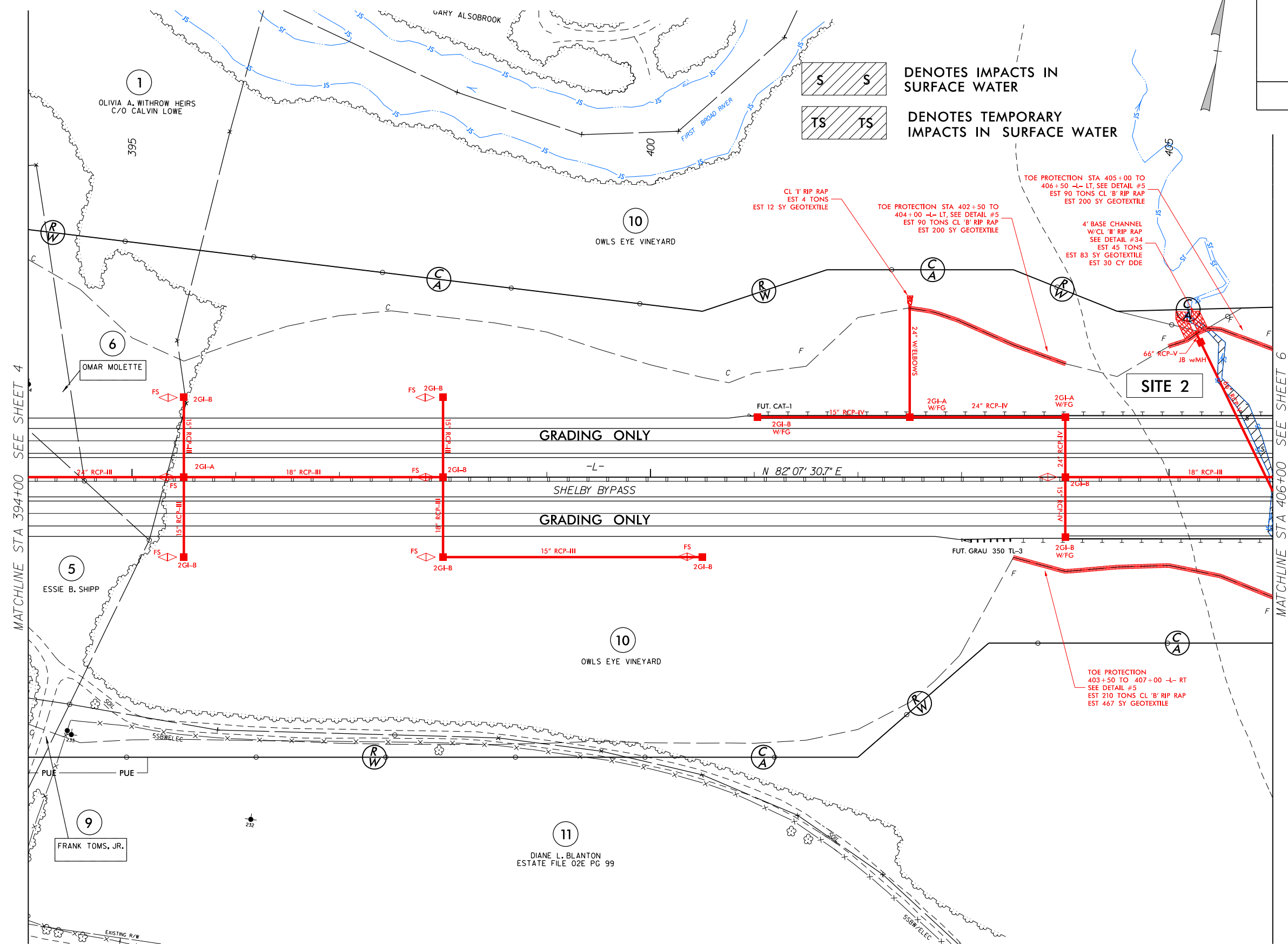
-L- US 74 (SHELBY BYPASS)



FOR -L- PLAN SEE SHEET 4

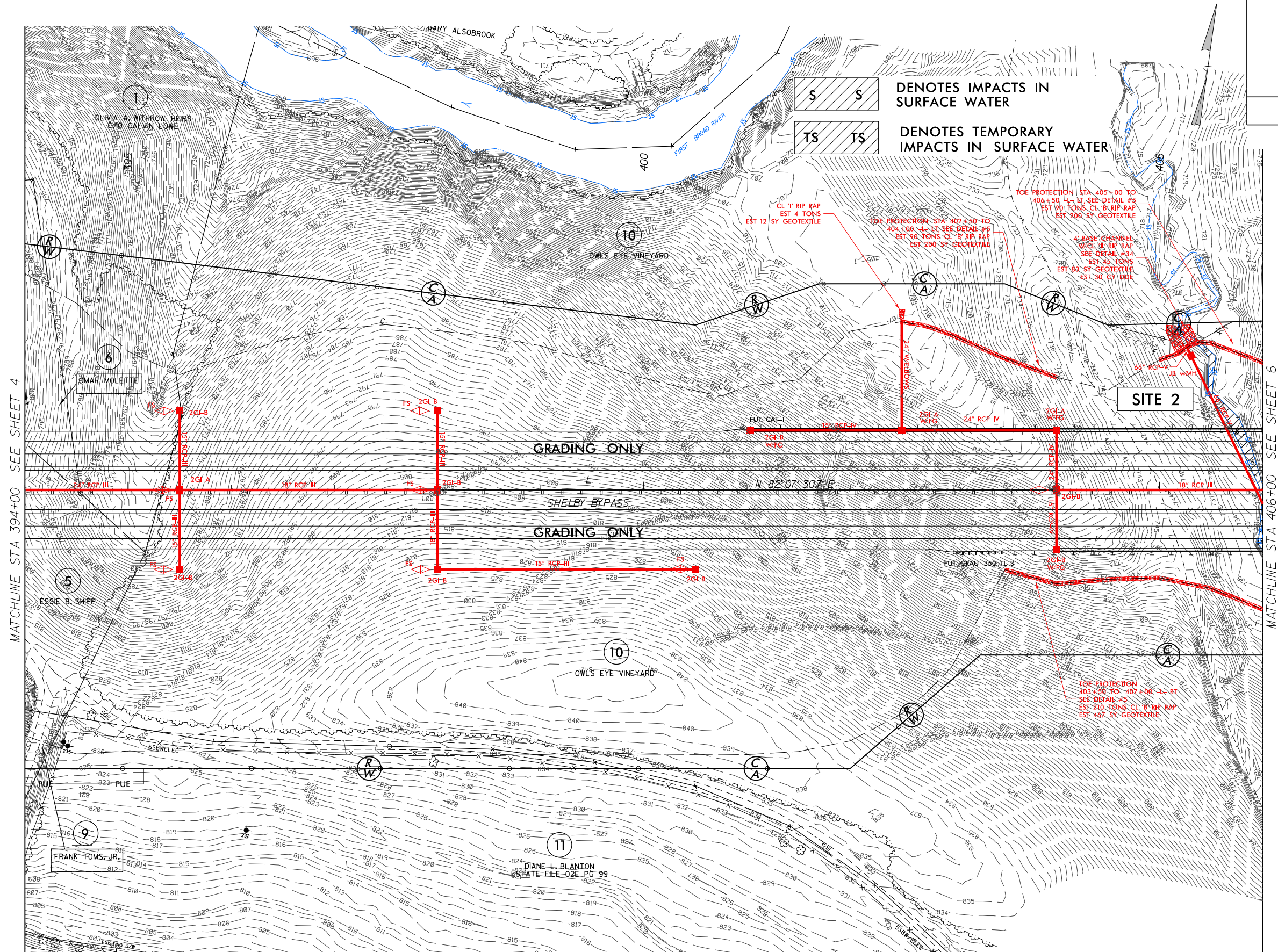
PERMIT DRAWING
SHEET 9 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		5
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER



PERMIT DRAWING
SHEET 10 OF 68

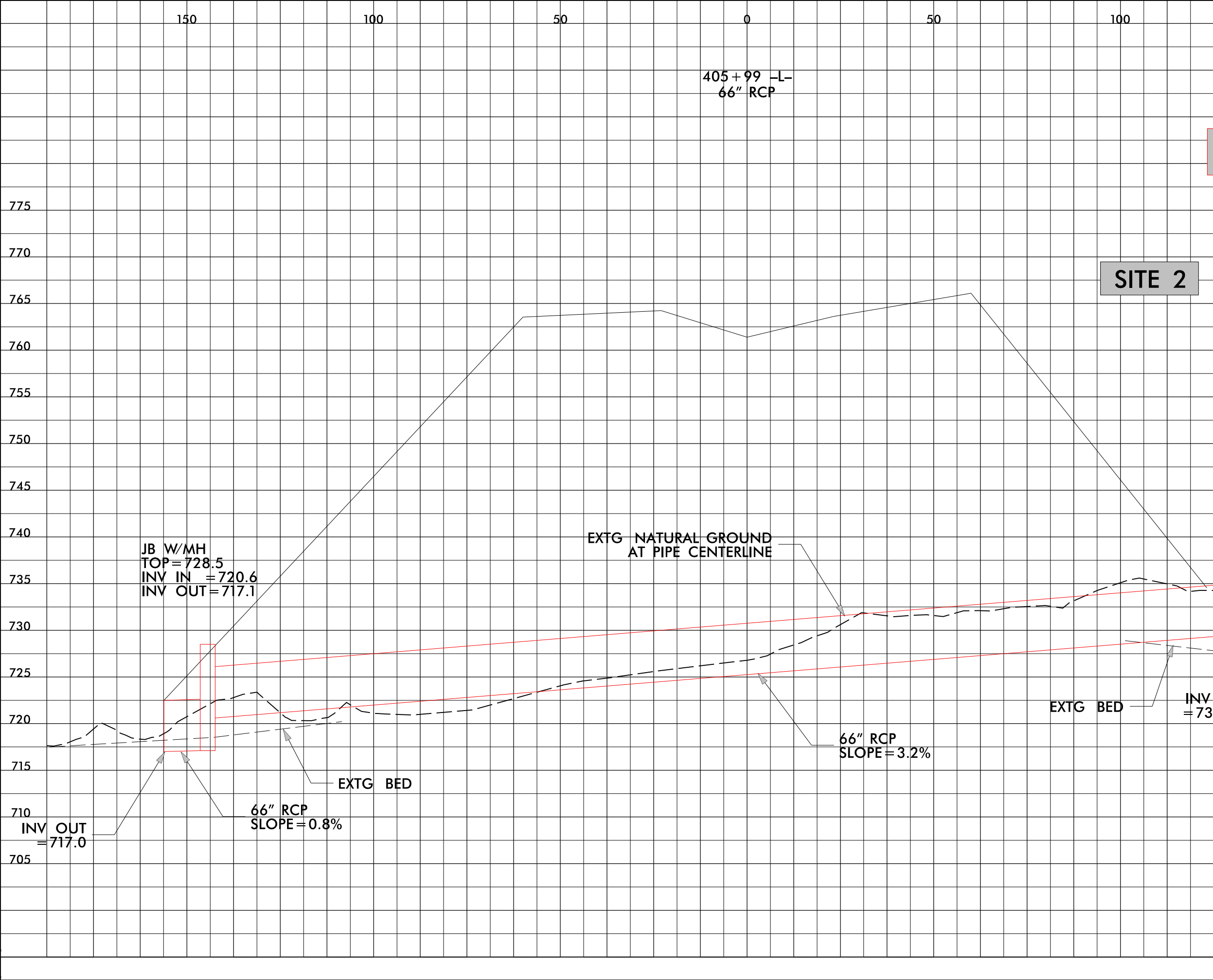
PROJECT REFERENCE NO.	SHEET NO.
R-2707C	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 44

5/14/99

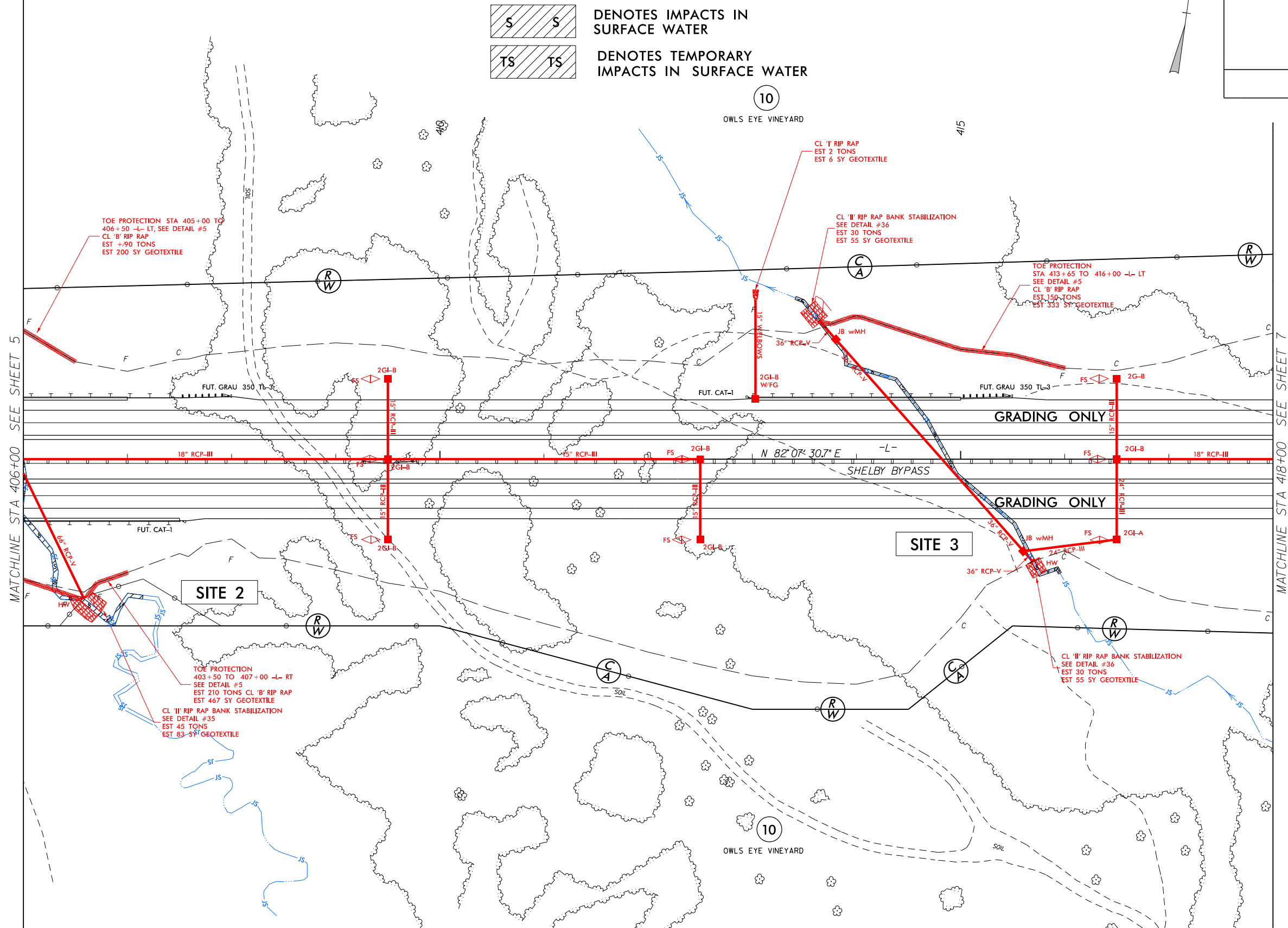
1/30/2016
U-2707C Hyd.prm-wet.psh_05b.dgn
10:00 AM



PROJECT REFERENCE NO.		SHEET NO.	
U-2707C		5b	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PERMIT DRAWING SHEET 11 OF 68			

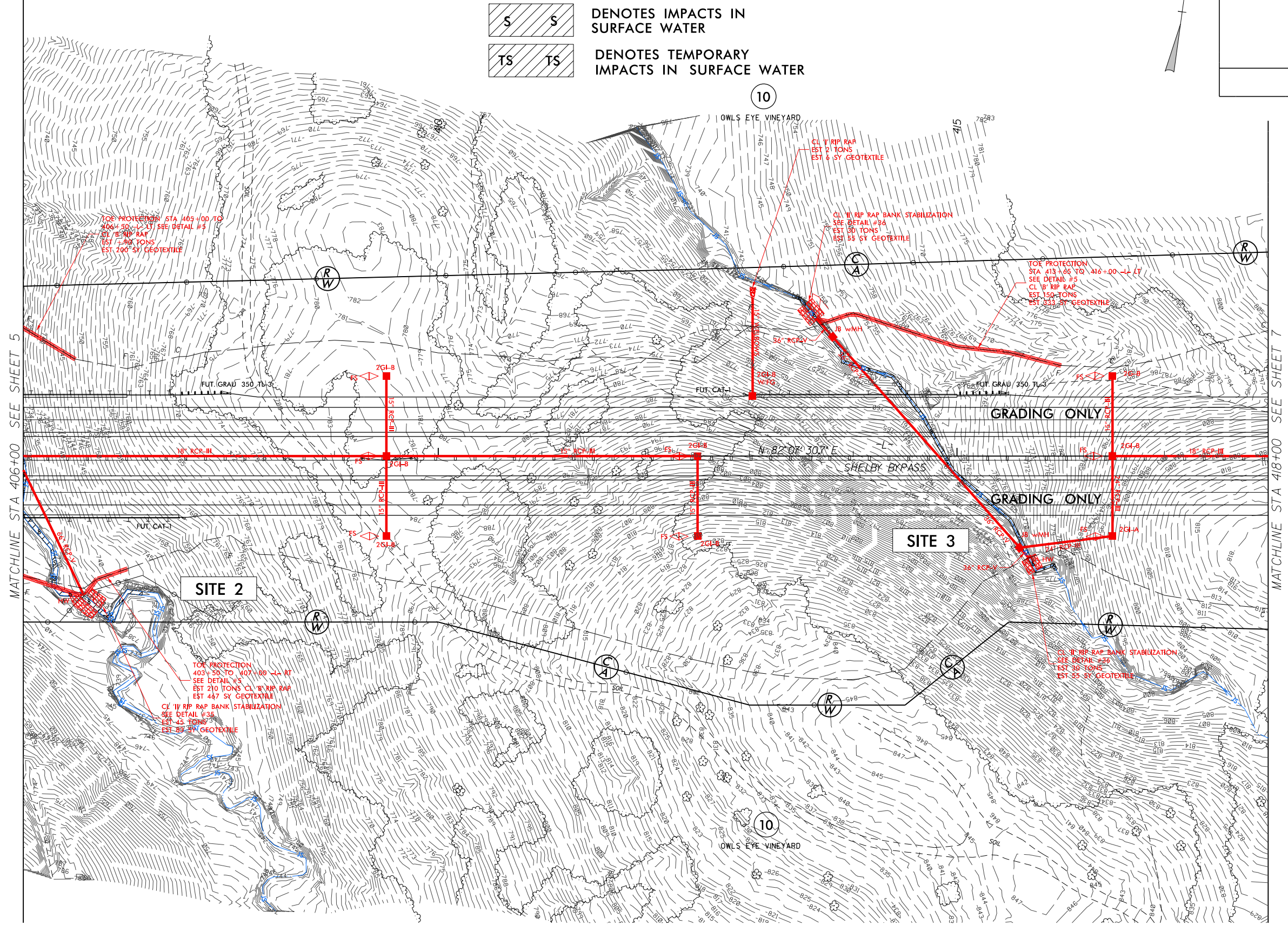
PERMIT DRAWING
SHEET 12 OF 68

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PERMIT DRAWING
SHEET 13 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		6
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	



DENOTES IMPACTS IN SURFACE WATER

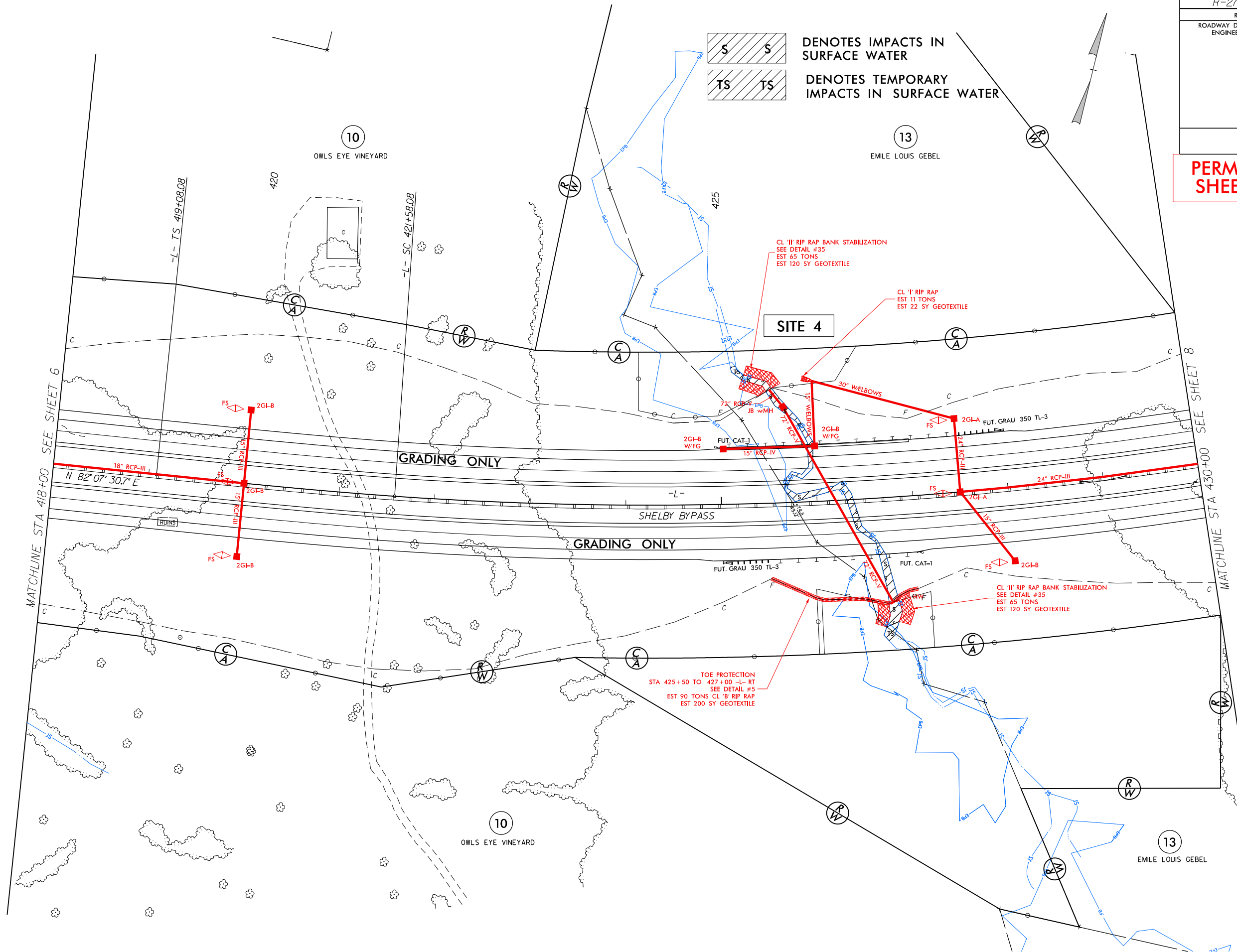
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

R/W REVISION 9-2-15 (PCP) - PARCEL 12 AND 13 - COMBINED PARCEL 12 WITH 13.

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		7
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 14 OF 68



FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 45

5/14/99

150

100

50

0

50

100

PROJECT REFERENCE NO.

R-2707C

ROADWAY DESIGN
ENGINEER

SHEET NO.

07b

HYDRAULICS
ENGINEER

426+15 -L-
72" RCP

PERMIT DRAWING
SHEET 16 OF 68

SITE 4

JB W/MH
TOP = 773.0
INV IN = 764.5
INV OUT = 759.6

EXTG NG AT
PIPE CENTERLINE

72" RCP
SLOPE = 1.2%

EXTG BED

INV IN
= 767.3

72" RCP
SLOPE = 0.8%

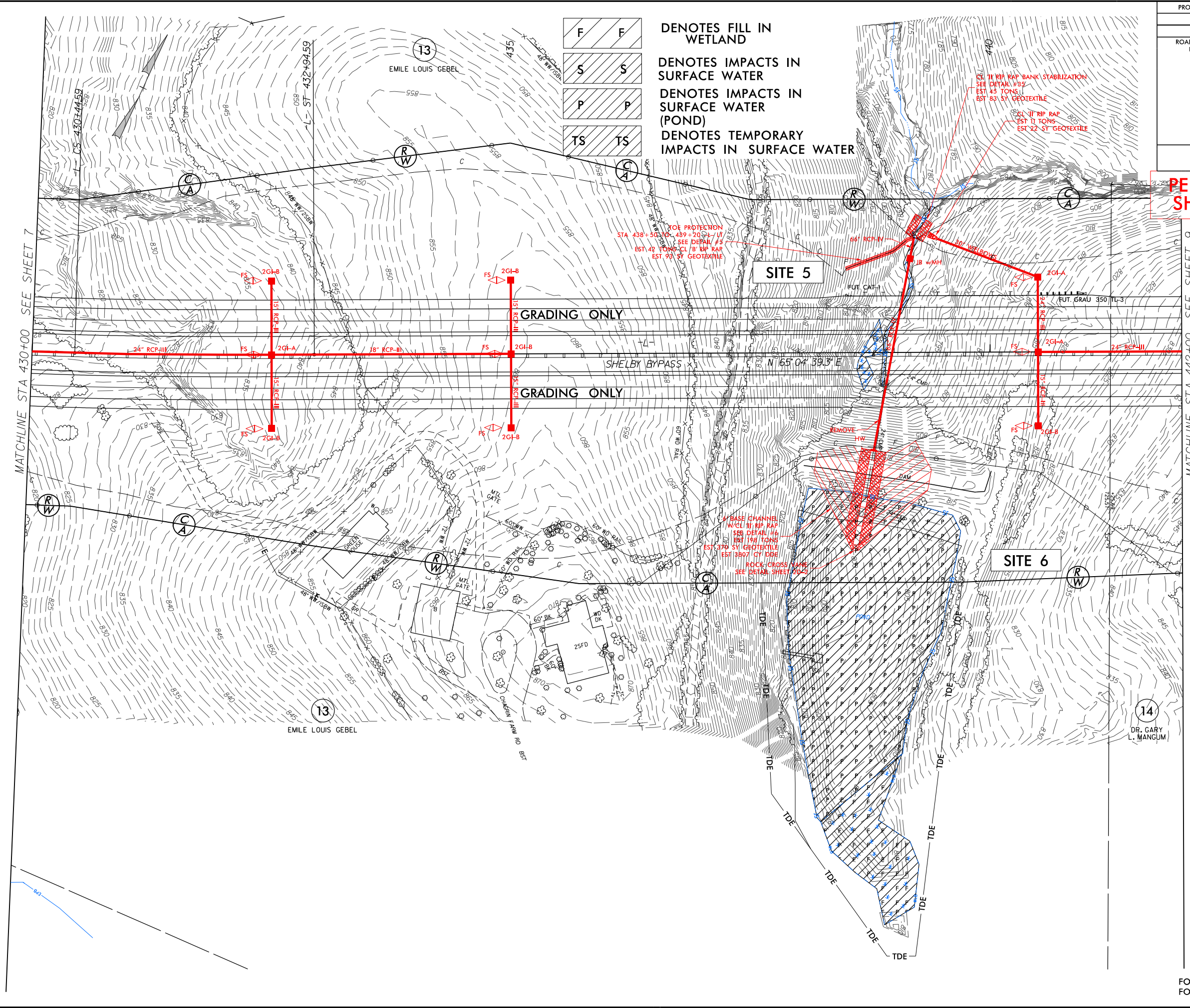
INV OUT
= 759.4

EXTG BED

1/30/2016
R-2707C Hyd.prm-wet.psh_07b.dgn
jba

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 18 OF 68



FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 45

5/14/99

150

100

50

0

50

100

PROJECT REFERENCE NO.

R-2707C

SHEET NO.

08b

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

PERMIT DRAWING
SHEET 19 OF 68

SITE 5

SITE 6

JB W/MH
TOP=791.00
INV IN=783.1
INV OUT=779.2

EXTG 24" CMP

INV IN
=789.0

66" RCP
SLOPE=0.9%

66" RCP
SLOPE=2.9%

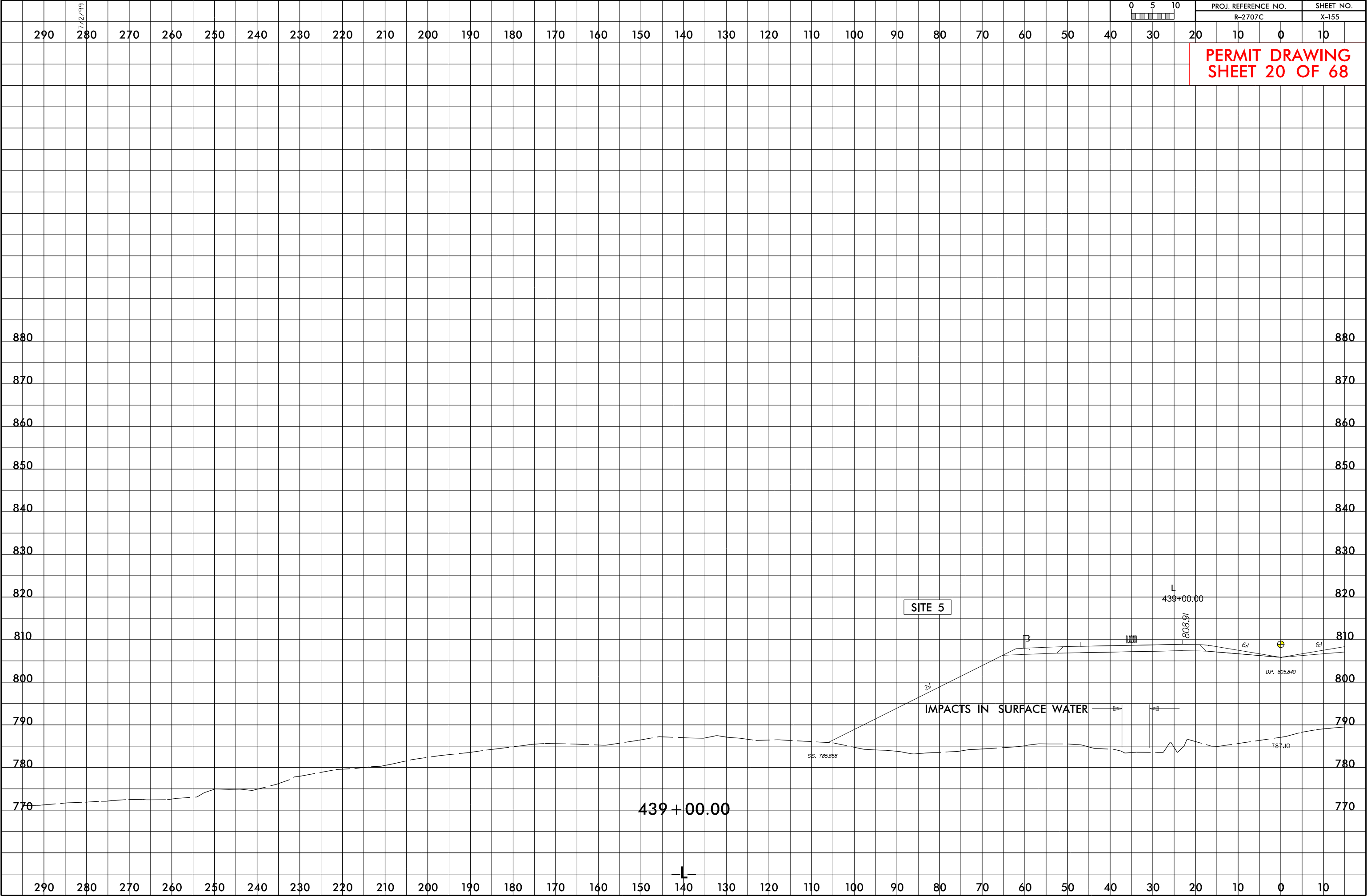
EXTG BED

EXTG NATURAL GROUND
AT PIPE CENTERLINE

INV OUT
=779.0

EXTG BED

1/30/2016
R-2707C Hyd.prm-wet_psh_08b.dgn
10:00 AM



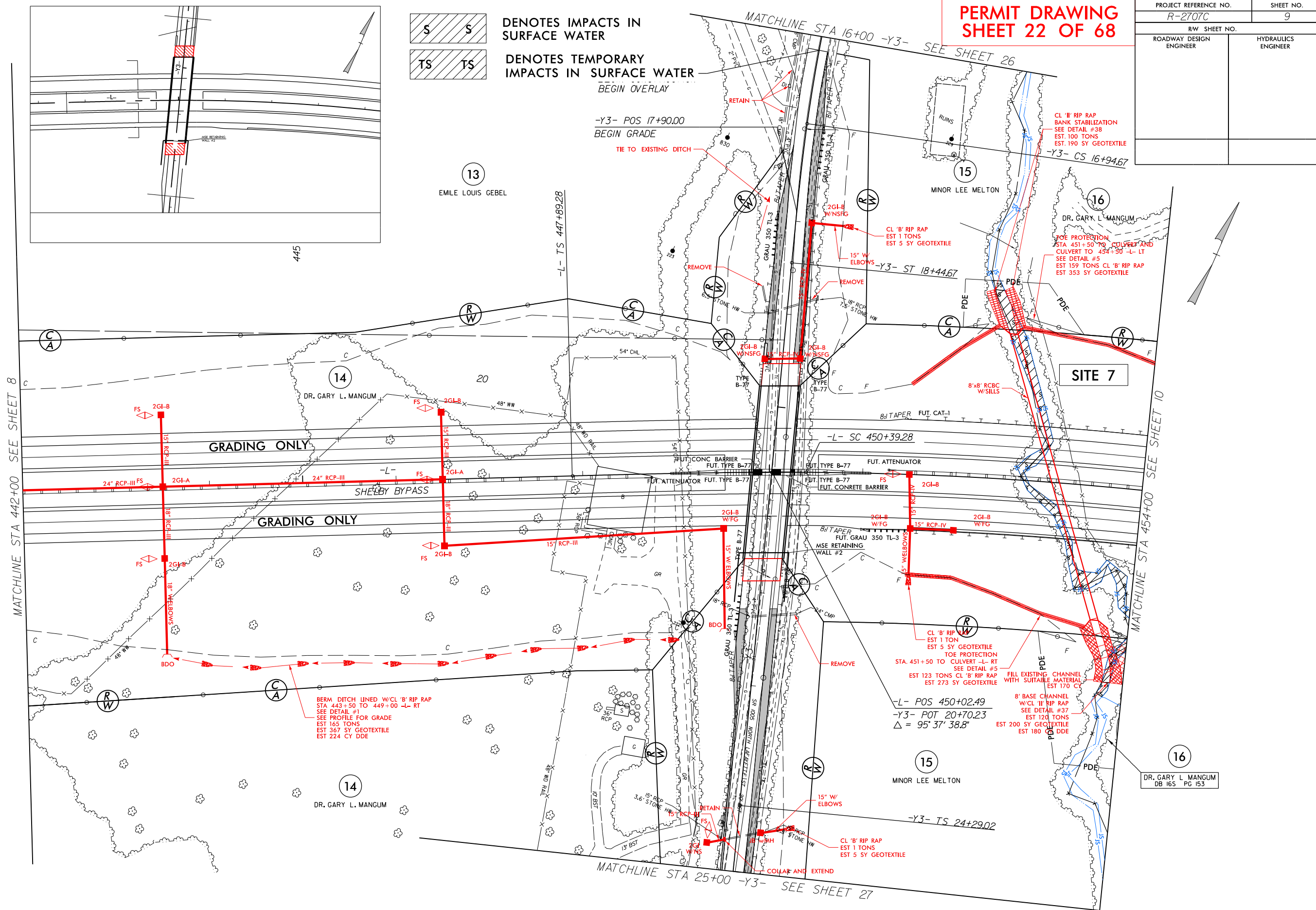


==

==

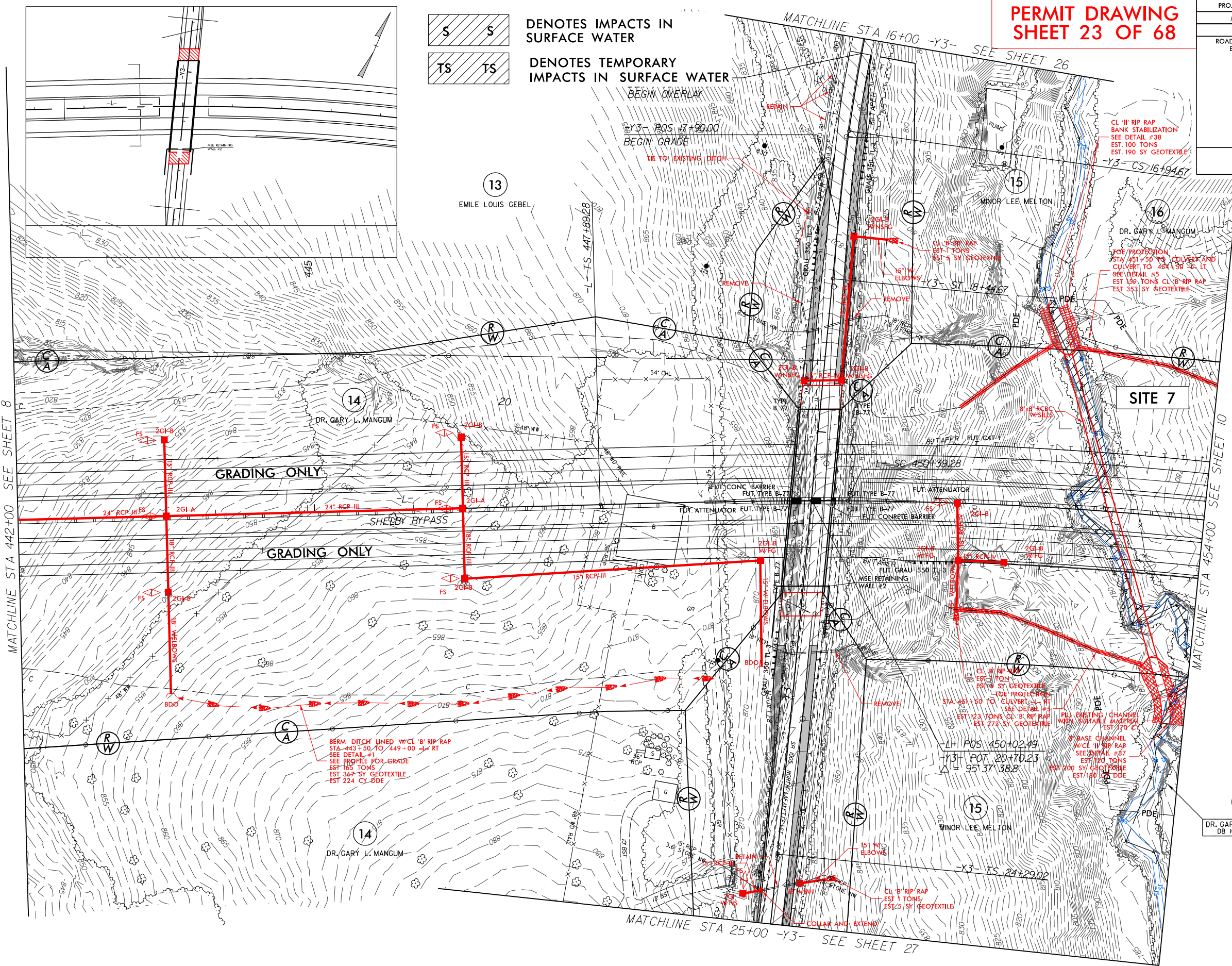
PERMIT DRAWING
SHEET 22 OF 68

PROJECT REFERENCE NO.	SHEET NO.
<i>R-2707C</i>	<i>9</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PERMIT DRAWING
SHEET 23 OF 68

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



5/14/99

1/30/2016
12:07:00
psh_09b.dgn

LT

150

100

50

0

50

100

150

RT

PROJECT REFERENCE NO.

SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

PERMIT DRAWING
SHEET 24 OF 68

SITE 7

CL STA 453+07 ±L±
1@ 8' x 8' RCBC W/SILL
SKEW = 70°
GP EL = 823.85

830

810

790

770

TB RT
TB LT

EXST BED

2.13:1 SKEWED
2:1 NORMAL

2.13:1 SKEWED
2:1 NORMAL

CL BED ELEV = 770.62
SLOPE = 1.16%

TB RT
TB LT
EXST BED
WATER SURFACE
PROFILE

PROJECT REFERENCE NO.	SHEET NO.
<i>R-2707C</i>	<i>10</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

A rectangular region filled with diagonal hatching (lines from top-left to bottom-right). Inside the rectangle, there are two bold, italicized 'S' labels positioned symmetrically.

DENOTES IMPACTS IN
SURFACE WATER

16
ARY L MANGUM

SITE 7

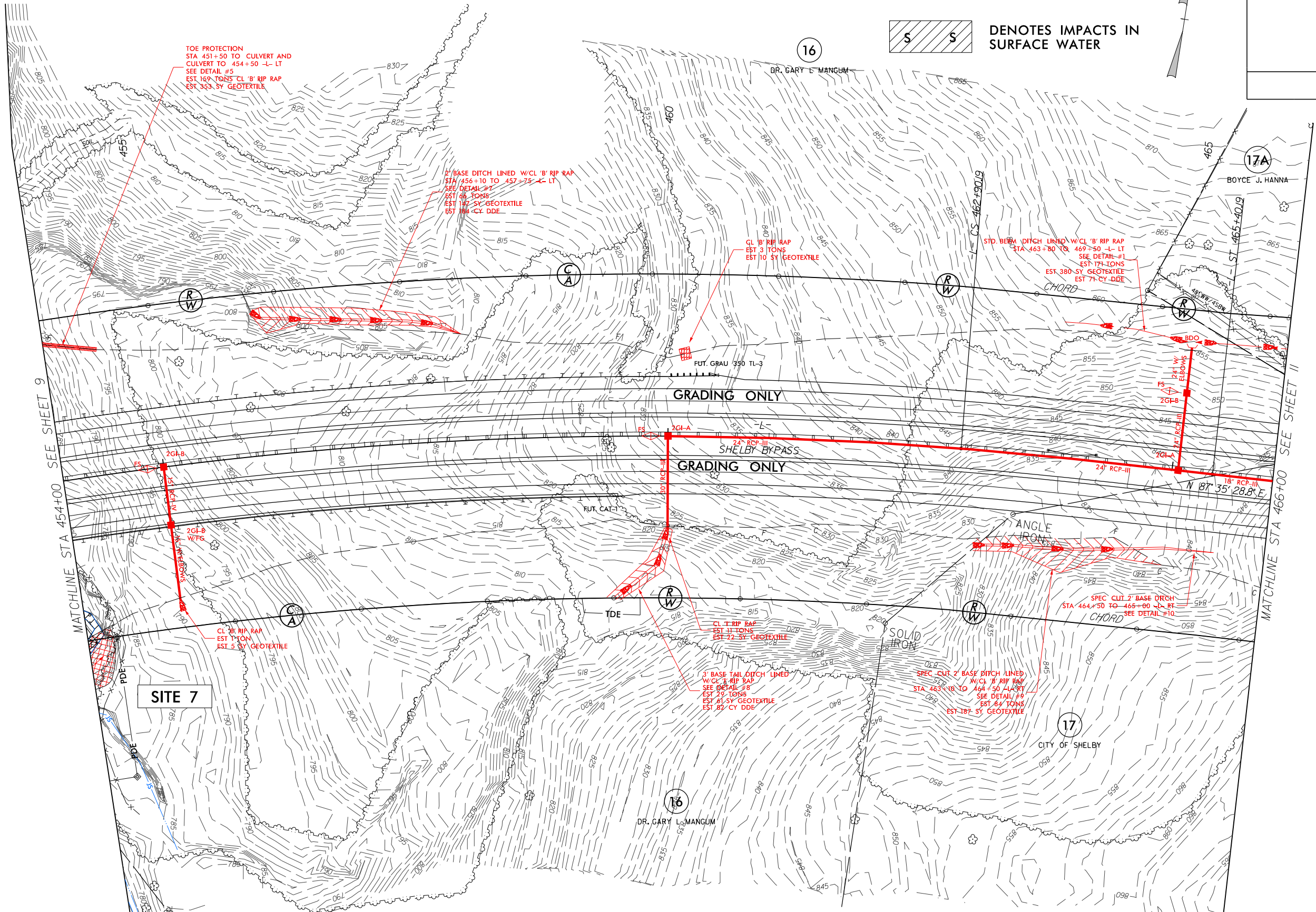
17
CITY OF SHELBY

CITY OF SHELBY

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 46

PERMIT DRAWING
SHEET 26 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		10
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER



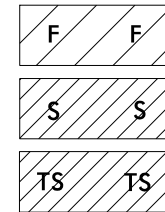
FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 46

REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 17A - CHANGED PROPERTY OWNER NAMES AND DEED INFORMATION.

PERMIT DRAWING
SHEET 27 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		11
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER

19
BRIDGETTE M. EPPS



DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-L- POT 474+45.79
-Y4-REV POT 24+05.50
 $\Delta = 52'03"41"$

CL '11' RIP RAP BANK STABILIZATION
SEE DETAIL #36
EST 30 TONS
EST 55 SY GEOTEXTILE
TOE PROTECTION
STA 475+75 TO 476+50 -L- LT
SEE DETAIL #5
EST 45 TONS CL 'B' RIP RAP
EST 100 SY GEOTEXTILE

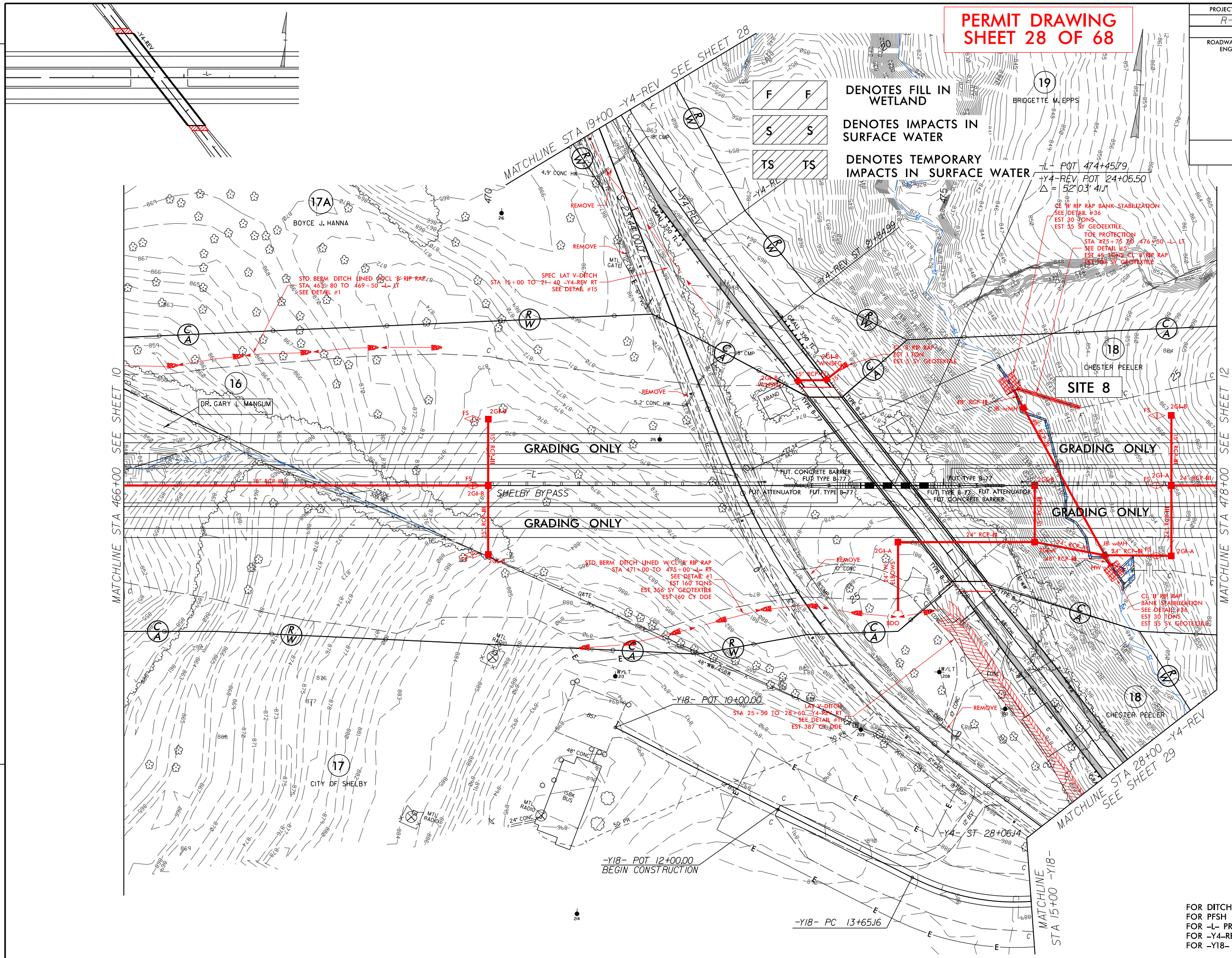
SITE 8

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 47
FOR -Y4-REV PROFILE SEE SHEET 57
FOR -Y18- PROFILE SEE SHEET 76

REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 17A - CHANGED PROPERTY OWNER NAMES AND DEED INFORMATION.

PERMIT DRAWING
SHEET 28 OF 68

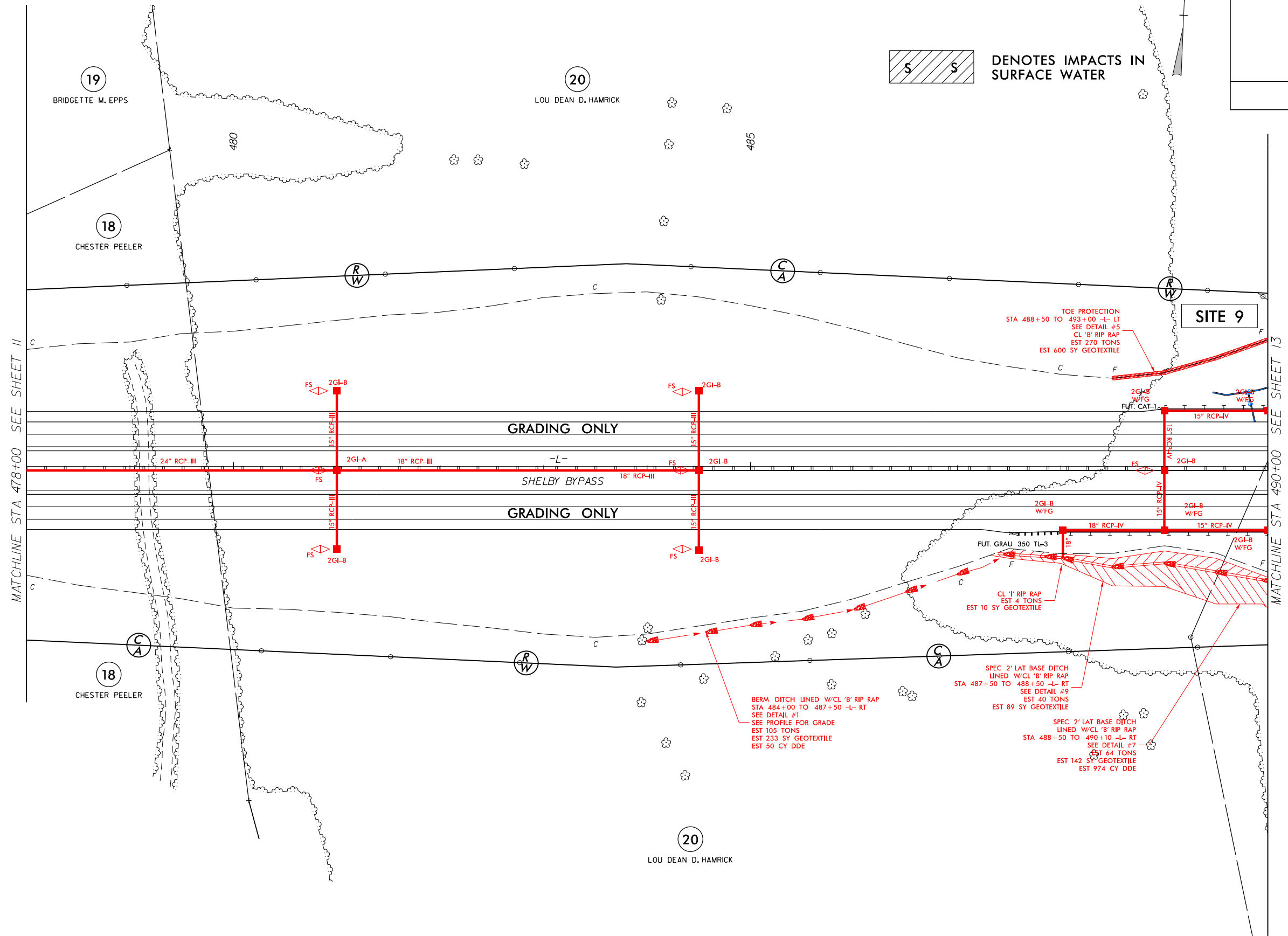
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		11
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	



FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 47
FOR -Y4-REV PROFILE SEE SHEET 57
FOR -Y18- PROFILE SEE SHEET 76

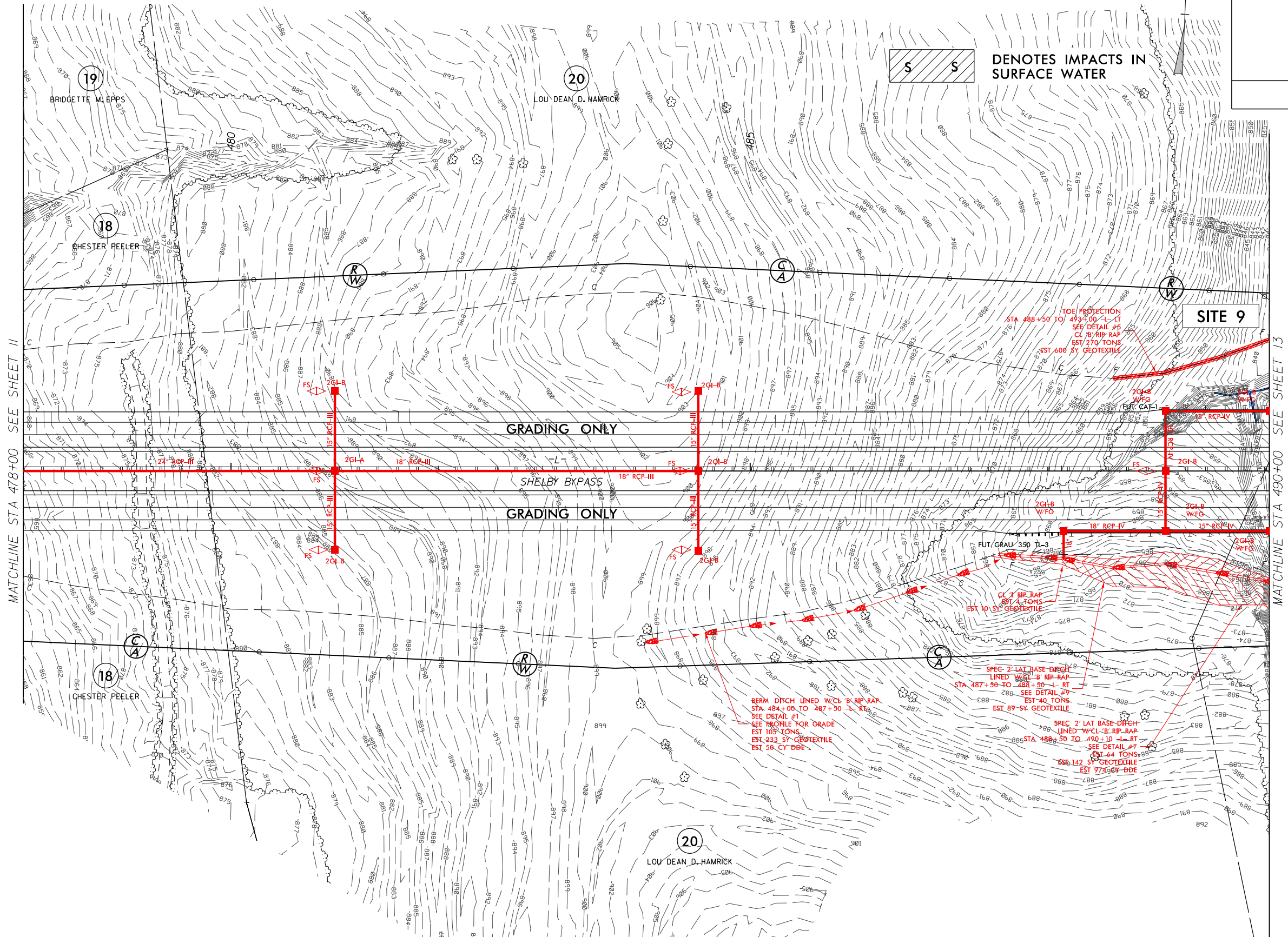
PERMIT DRAWING
SHEET 30 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		12
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER



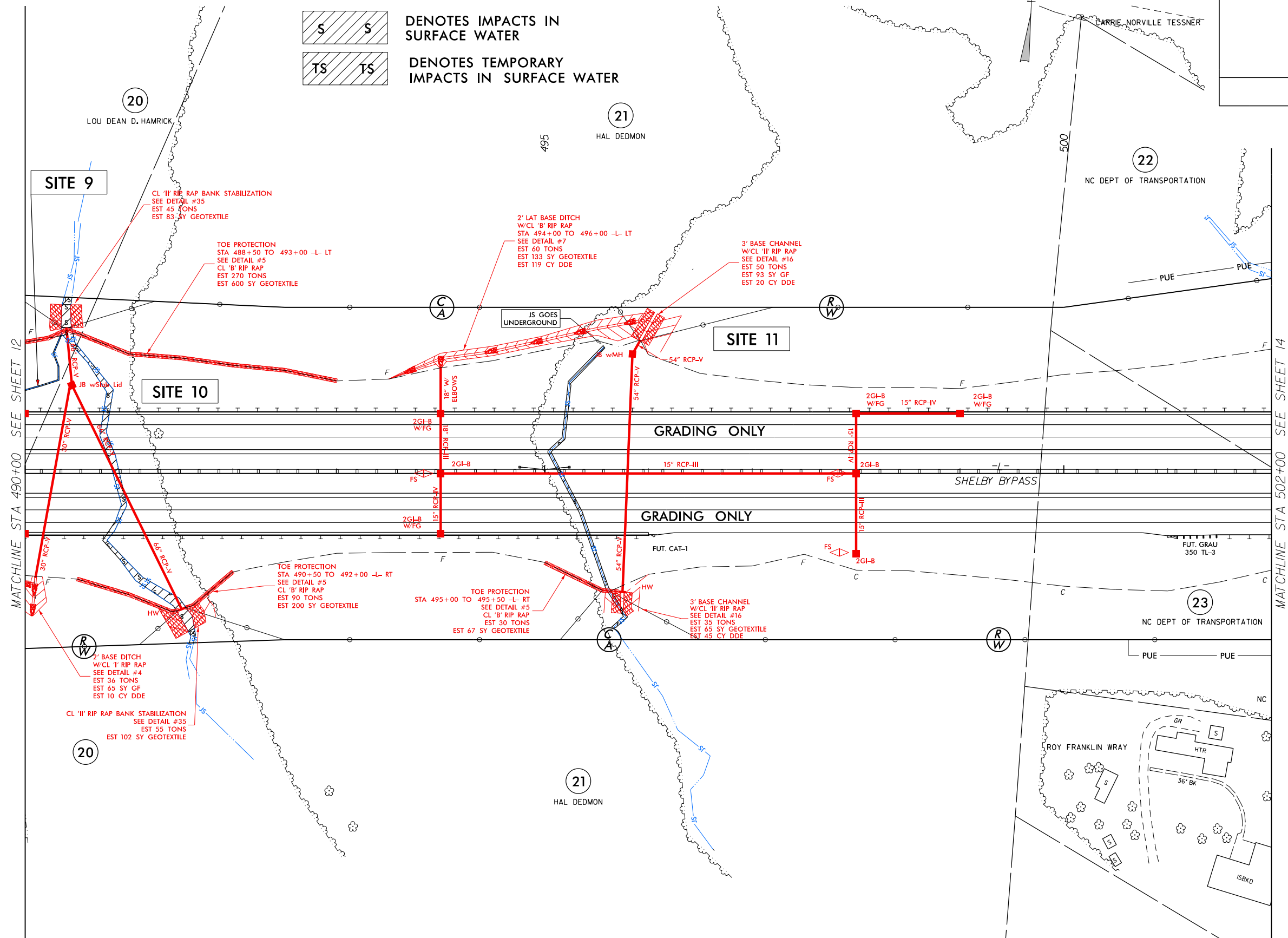
PERMIT DRAWING
SHEET 31 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		12
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	



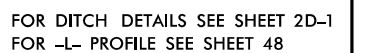
PERMIT DRAWING
SHEET 32 OF 68

PROJECT REFERENCE NO.	SHEET NO.
<i>R-2707C</i>	<i>13</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



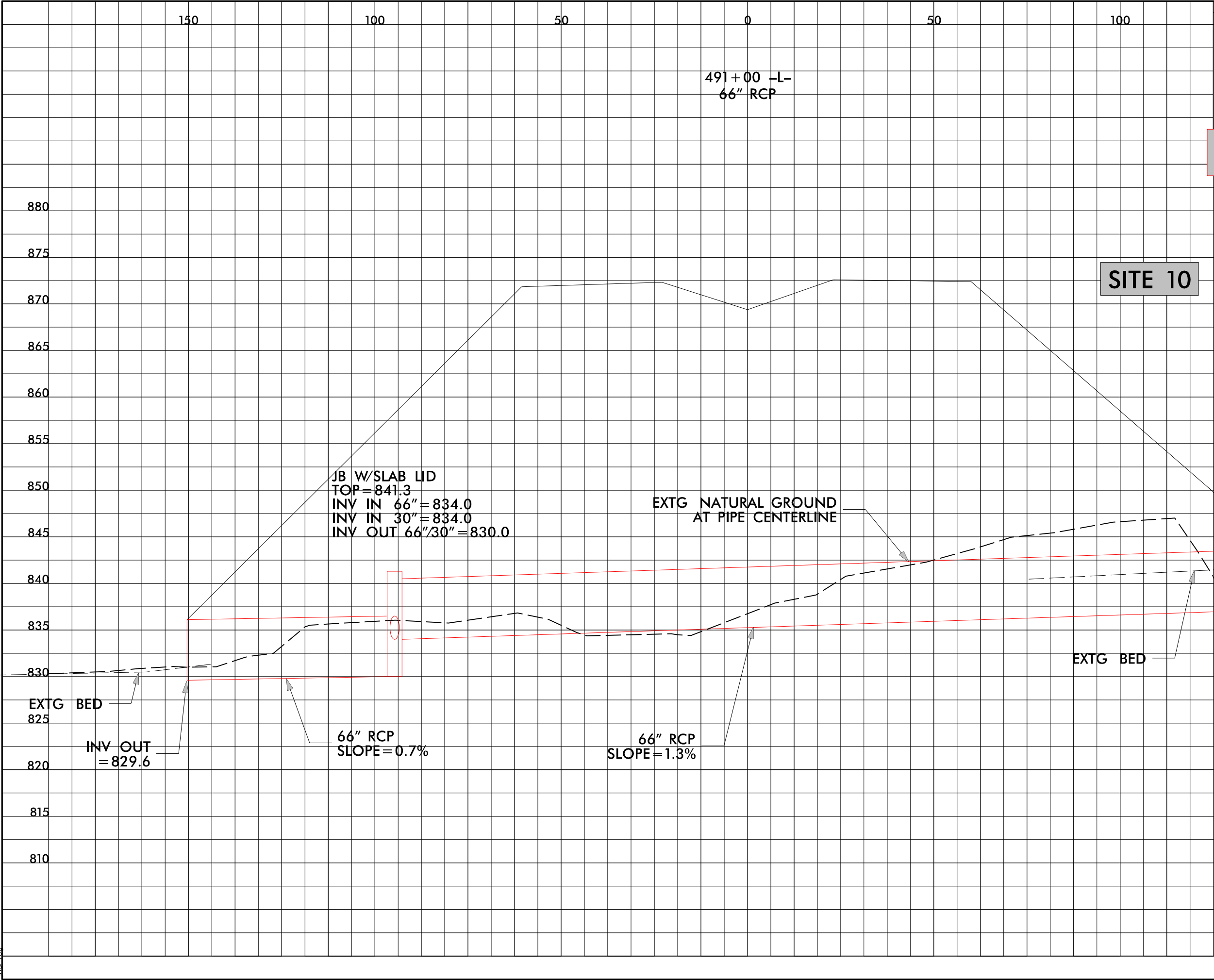
FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 48

PROJECT REFERENCE NO.	SHEET NO.
<i>R-2707C</i>	<i>13</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

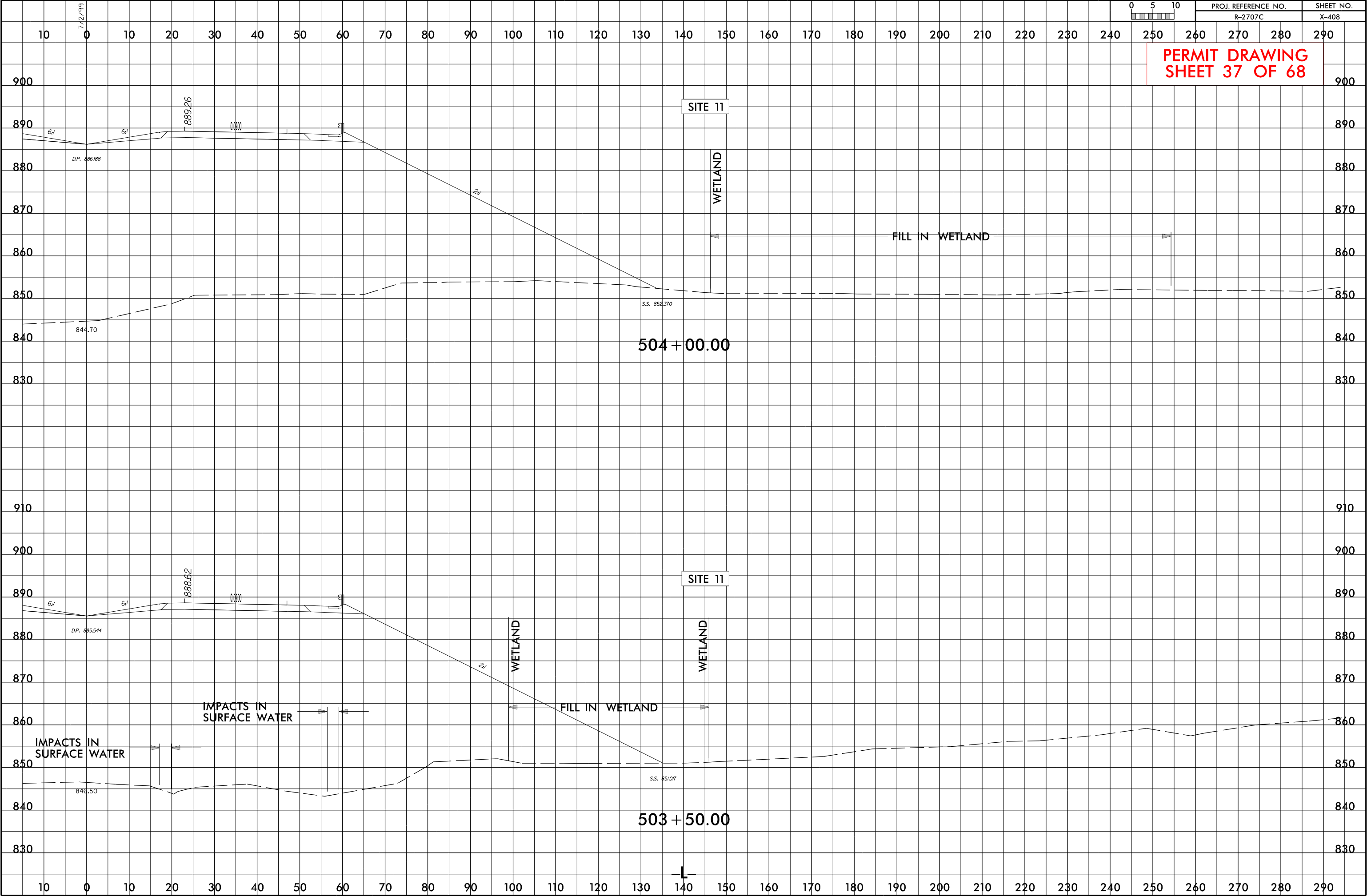


5/14/99

1/30/2016
227070
Rid.prm_wet.psh_13b.dgn
13b.dgn

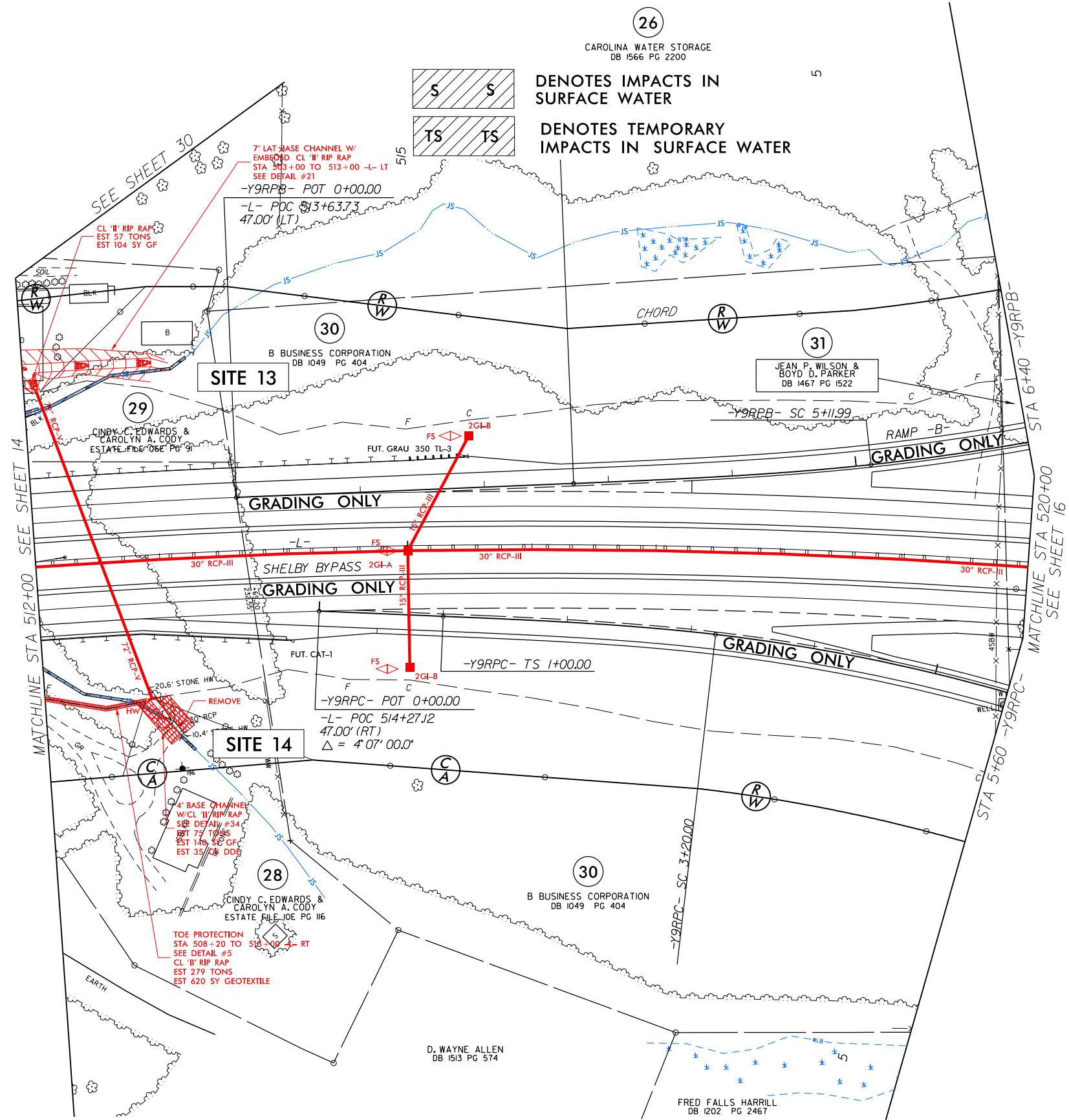


PROJECT REFERENCE NO.		SHEET NO.	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PERMIT DRAWING SHEET 34 OF 68			



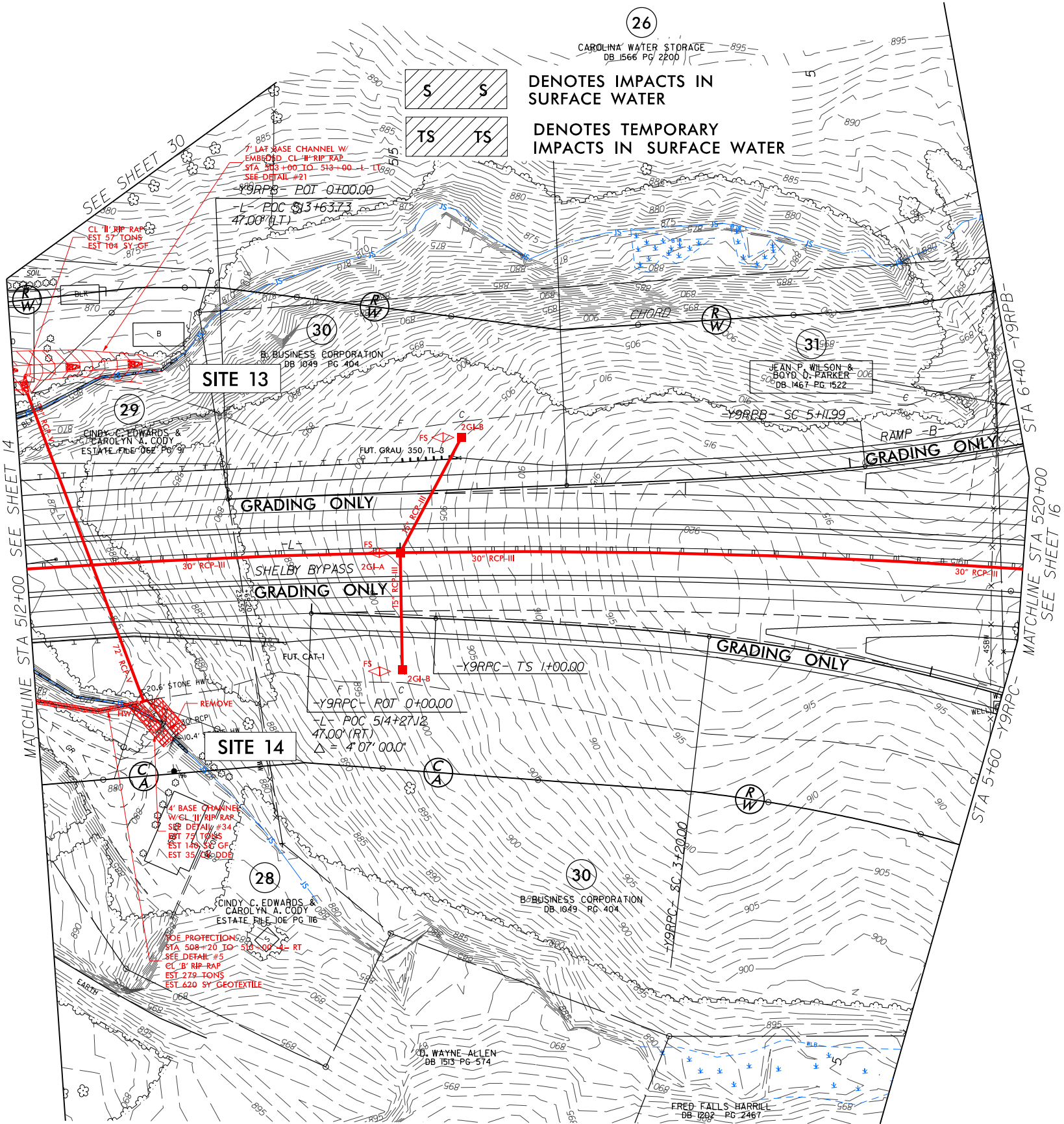
PROJECT REFERENCE NO.	SHEET NO.
R-2707C	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 38 OF 68



PROJECT REFERENCE NO.	SHEET NO.
R-2707C	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 39 OF 68



5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	15b
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 40 OF 68

915

910

905

900

895

890

885

880

875

870

865

860

855

SITE 14

512 + 50 -L-
72" RCP

EXTG NATURAL GROUND
AT PIPE CENTERLINE

EXTG 30" RCP

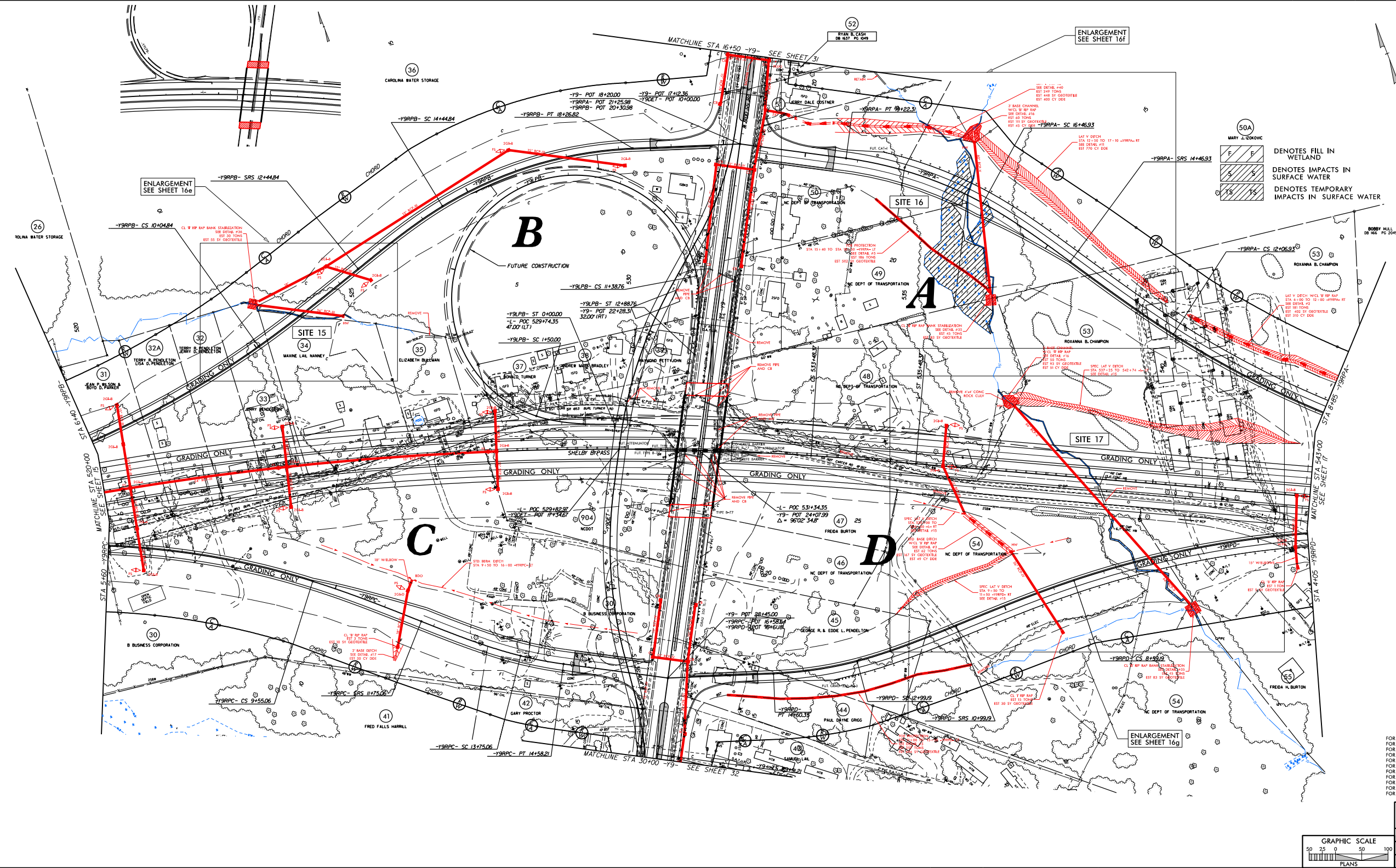
EXTG BED

INV IN
= 869.4

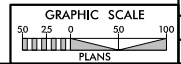
72" RCP
SLOPE = 2.75%

INV OUT
= 862.1

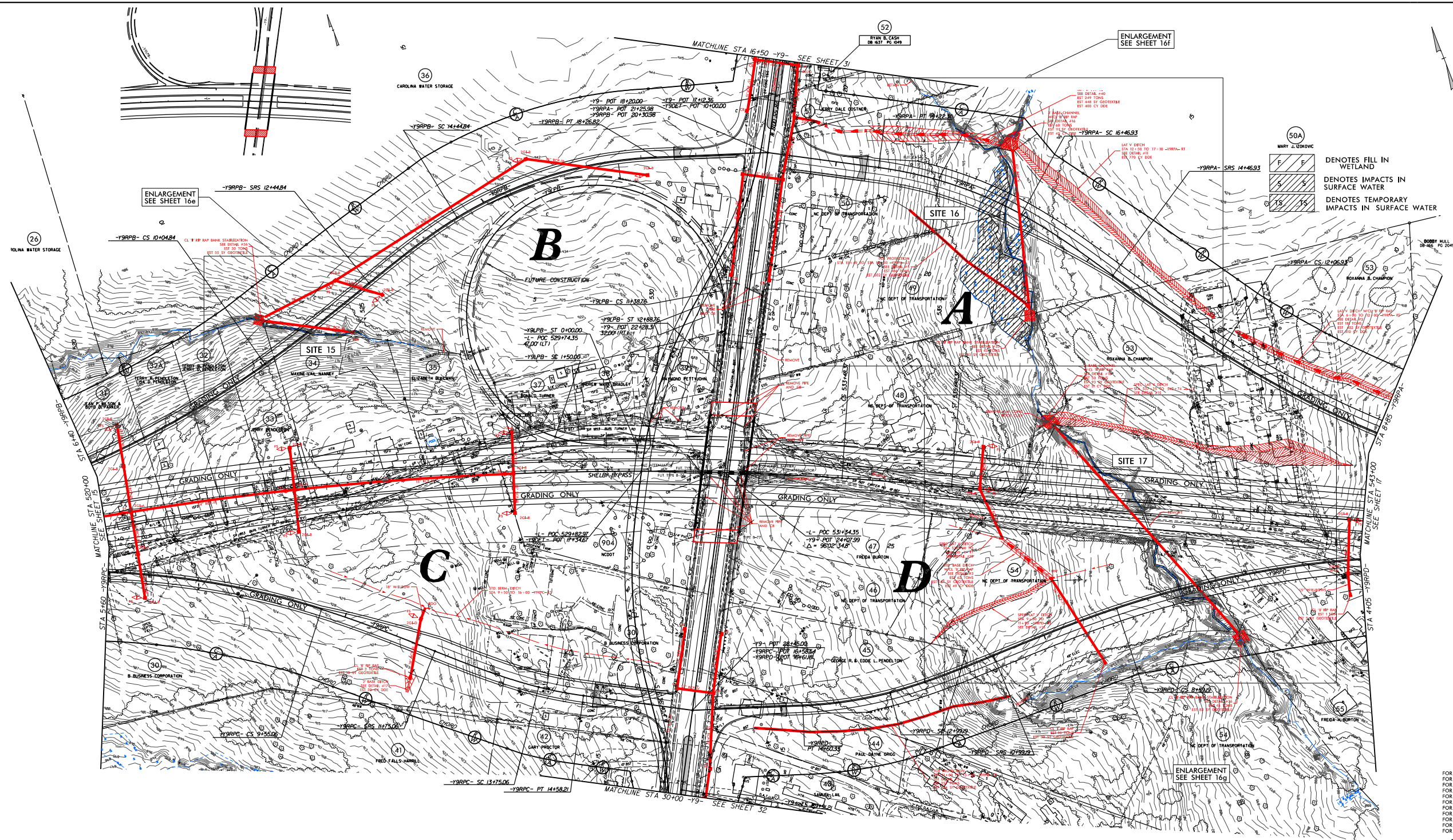
11/30/2016
R-2707C Hyd.prm_wet.psh_15b.dgn
10:00 AM



FOR -Y9- DETOUR DETAILS SEE SHEETS 2B-1 & 2B-2
FOR INTERSECTION DETAILS SEE SHEETS 2B-3 & 2B-4
FOR DITCH DETAILS SEE SHEET 2D-1
FOR FISH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 50
FOR -Y9- PROFILE SEE SHEET 60
FOR -Y9RPA- PROFILE SEE SHEET 61
FOR -Y9RPA- PROFILE SEE SHEET 62
FOR -Y9RPA- PROFILE SEE SHEET 63
FOR -Y9RPA- PROFILE SEE SHEET 64
FOR -Y9RPA- PROFILE SEE SHEET 65



LOCATION: INTERCHANGE AT
-L- US 74 BYPASS
AND -Y9- NC 18
TP NO: R-2707C COUNTY: CLEVELAND
DESIGNED BY: T. HUFFMAN
CHECKED BY: T. REID DATE: 12/13/12

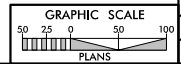


50A
MARY J. DOWD

F	F
S	S
TS	TS

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -Y9- DETOUR DETAILS SEE SHEETS 2B-1 & 2B-2
FOR INTERSECTION DETAILS SEE SHEETS 2B-3 & 2B-4
FOR DITCH DETAILS SEE SHEET 2D-1
FOR FISH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 50
FOR -Y9- PROFILE SEE SHEET 60
FOR -Y9RPA- PROFILE SEE SHEET 61
FOR -Y9RPA- PROFILE SEE SHEET 62
FOR -Y9RPA- PROFILE SEE SHEET 63
FOR -Y9RPA- PROFILE SEE SHEET 64
FOR -Y9RPA- PROFILE SEE SHEET 65



5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	16b
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 43 OF 68

200

100

0

100

200

538+58 -L-
66" RCP

7+07 -Y9RPD-
66" RCP

SITE 17

925

920

915

910

905

900

895

EXTG BED
890

885

880

875

870

865

EXTG 4'x4'
CULVERT

INV IN
=895.5

EXTG BED

66" RCP
SLOPE=3.1%

EXTG 48" CMP

INV OUT
=879.0

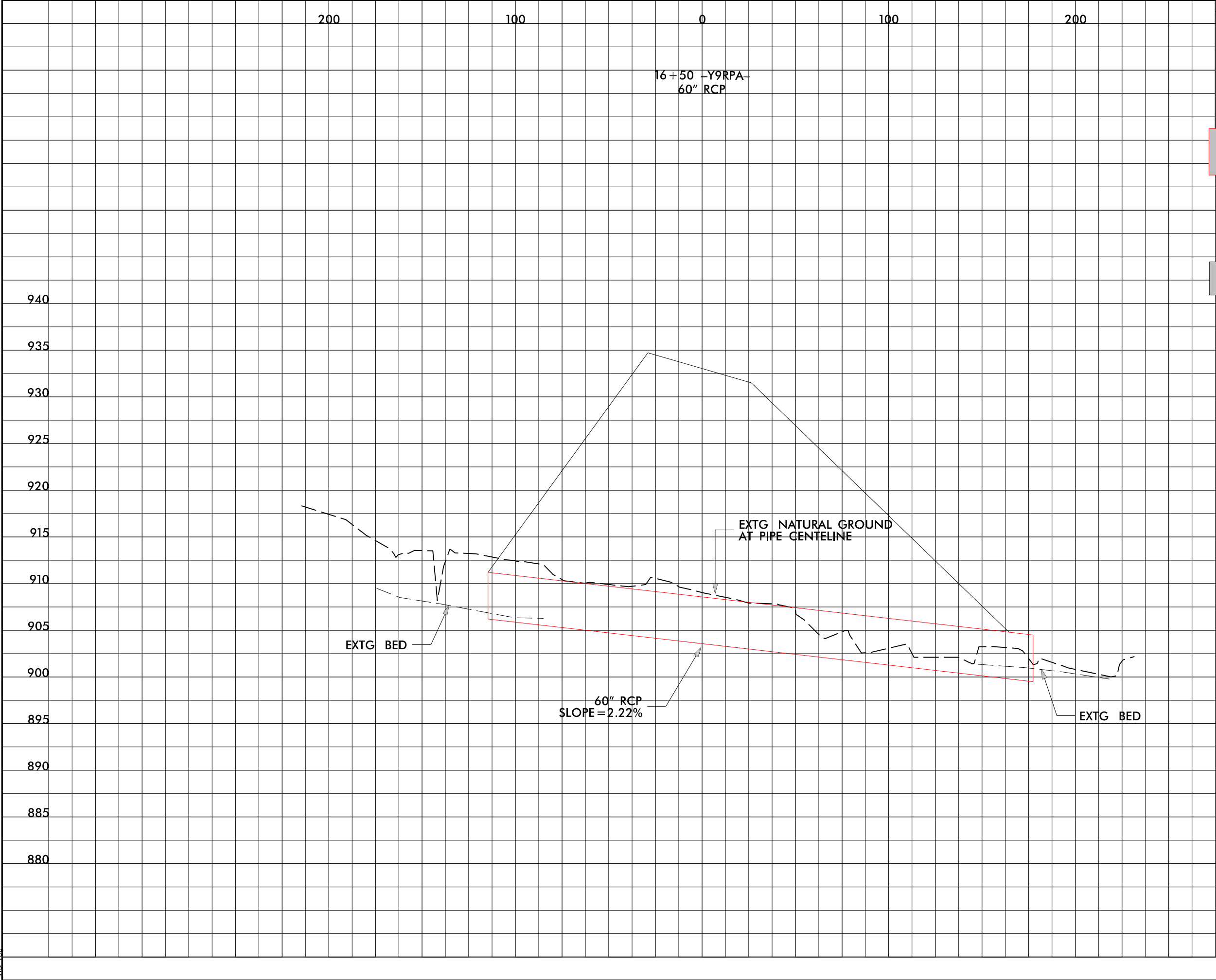
EXTG BED

EXTG NATURAL GROUND
AT PIPE CENTERLINE

R-2707C Hyd.prm-wet.psh_16b.dgn
11/30/2016 10:00:00 AM

5/14/99

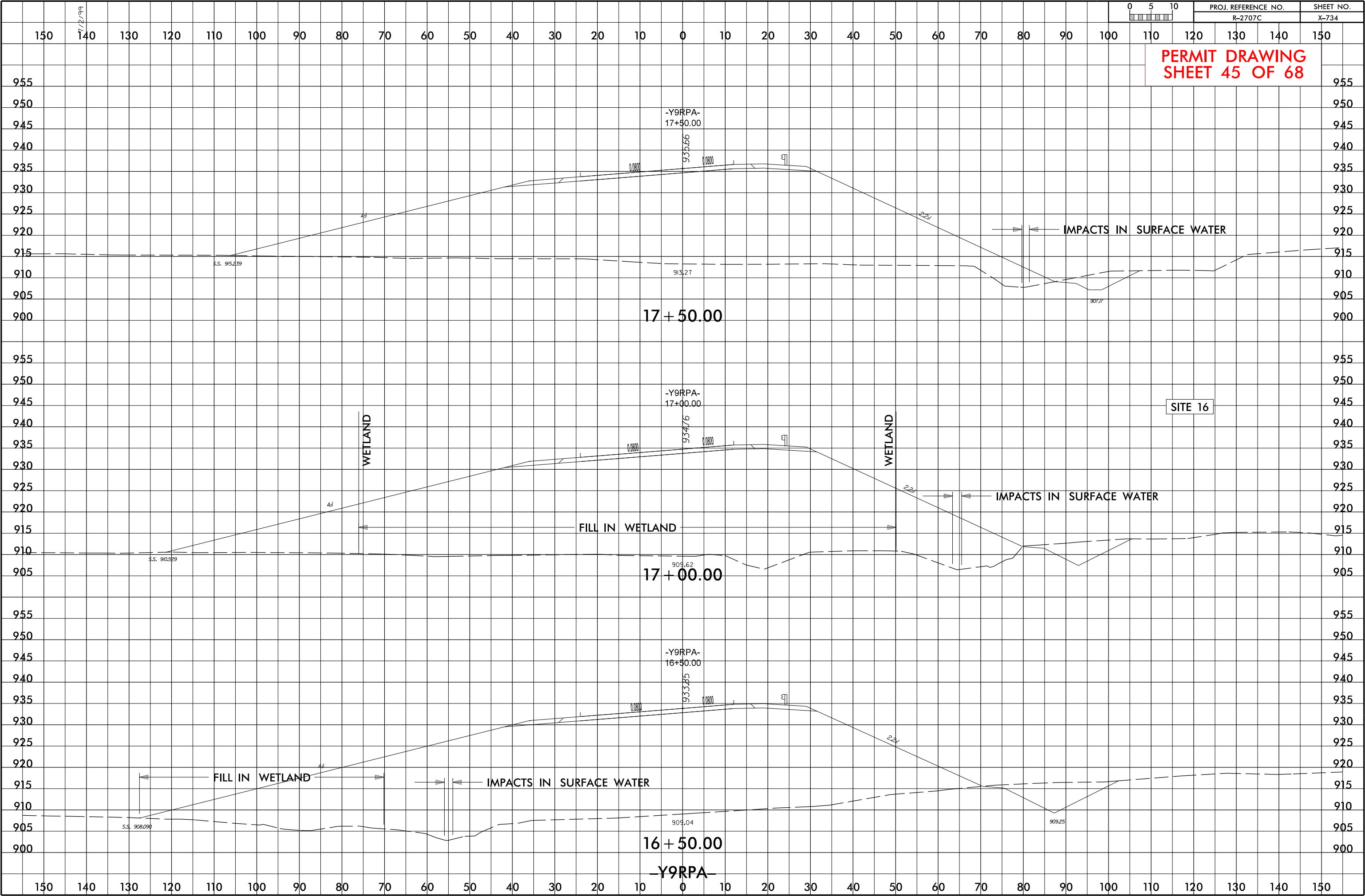
11/30/2016
R-2707C Hyd.prm-wet.psh_16c.dgn
16c.dgn



PROJECT REFERENCE NO.		SHEET NO.
R-2707C		16c
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

**PERMIT DRAWING
SHEET 44 OF 68**

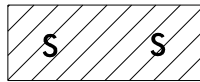
SITE 16



8/17/99

REVISIONS

12/1/2016
R2707C_Hyd_prm_wet_psh_16e_view-in.dgn
bclm



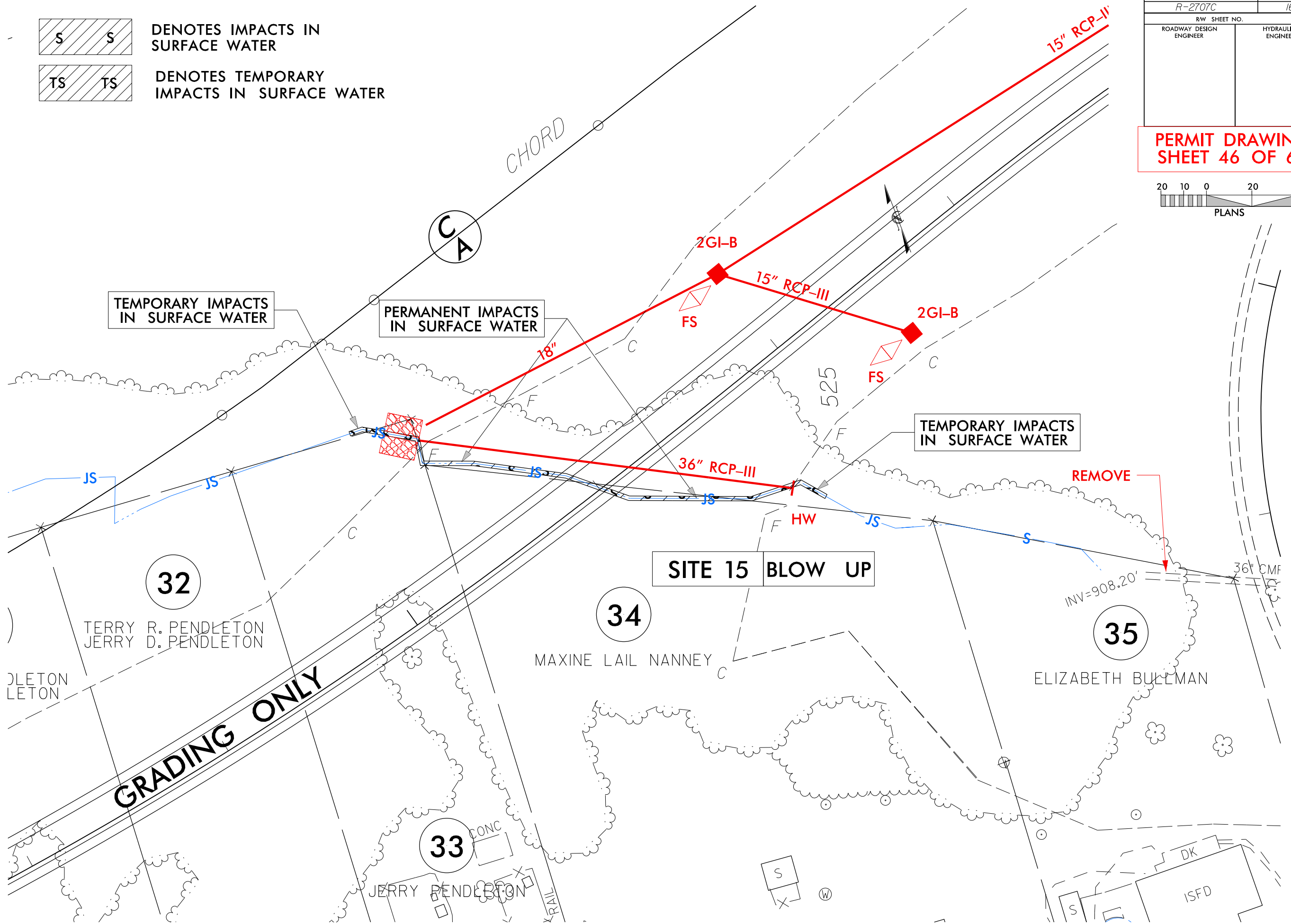
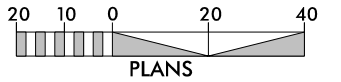
DENOTES IMPACTS IN
SURFACE WATER



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	16e
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

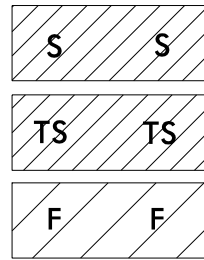
PERMIT DRAWING
SHEET 46 OF 68



8/17/99

REVISIONS

12/1/2016
R-2707C_Hyd_prm_wet_psh_16f_view.indgn
celam

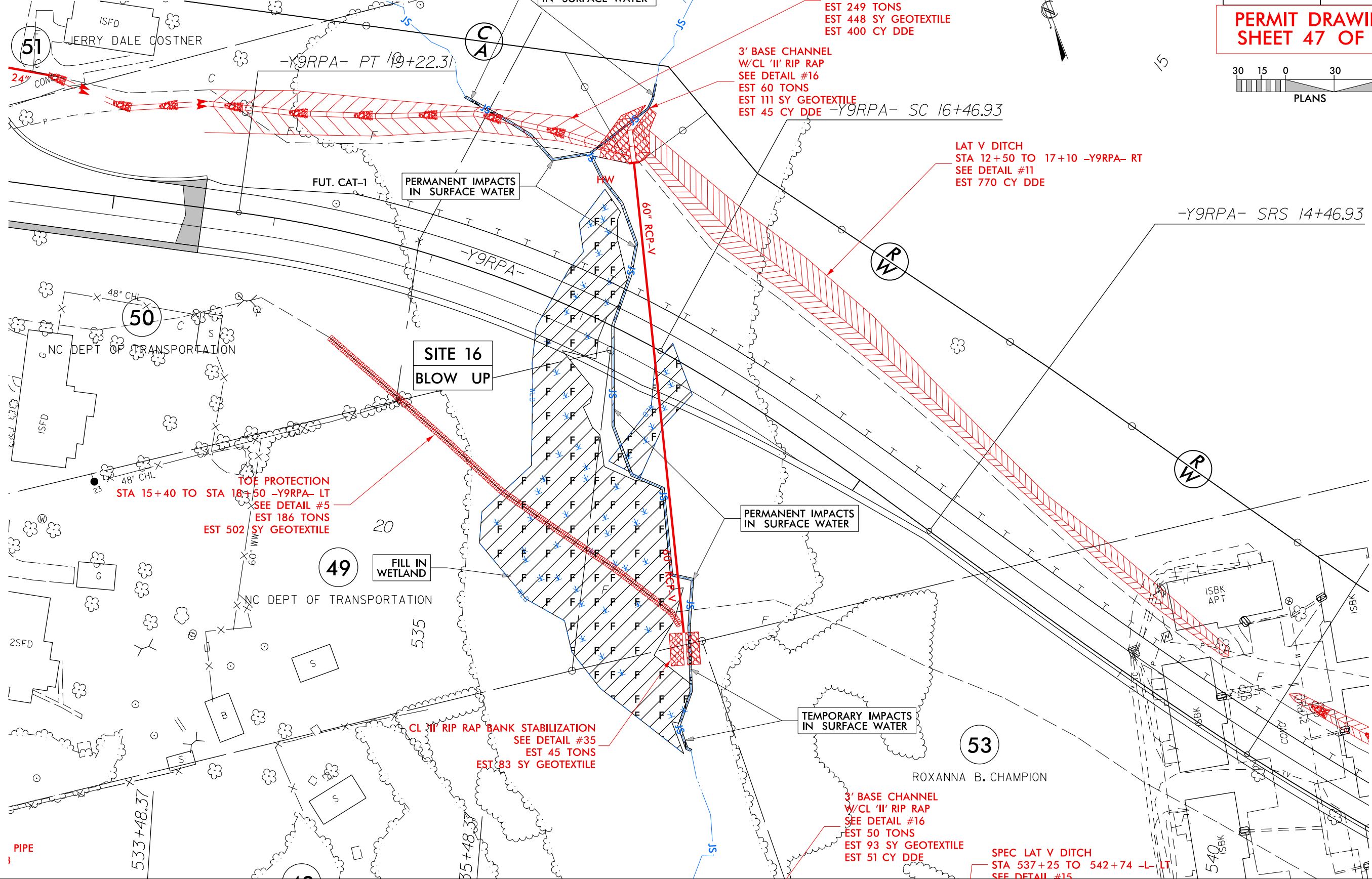


S
TS
F

**DENOTES IMPACTS IN
SURFACE WATER**

**DENOTES TEMPORARY
IMPACTS IN SURFACE WATER**

**DENOTES FILL IN
WETLAND**



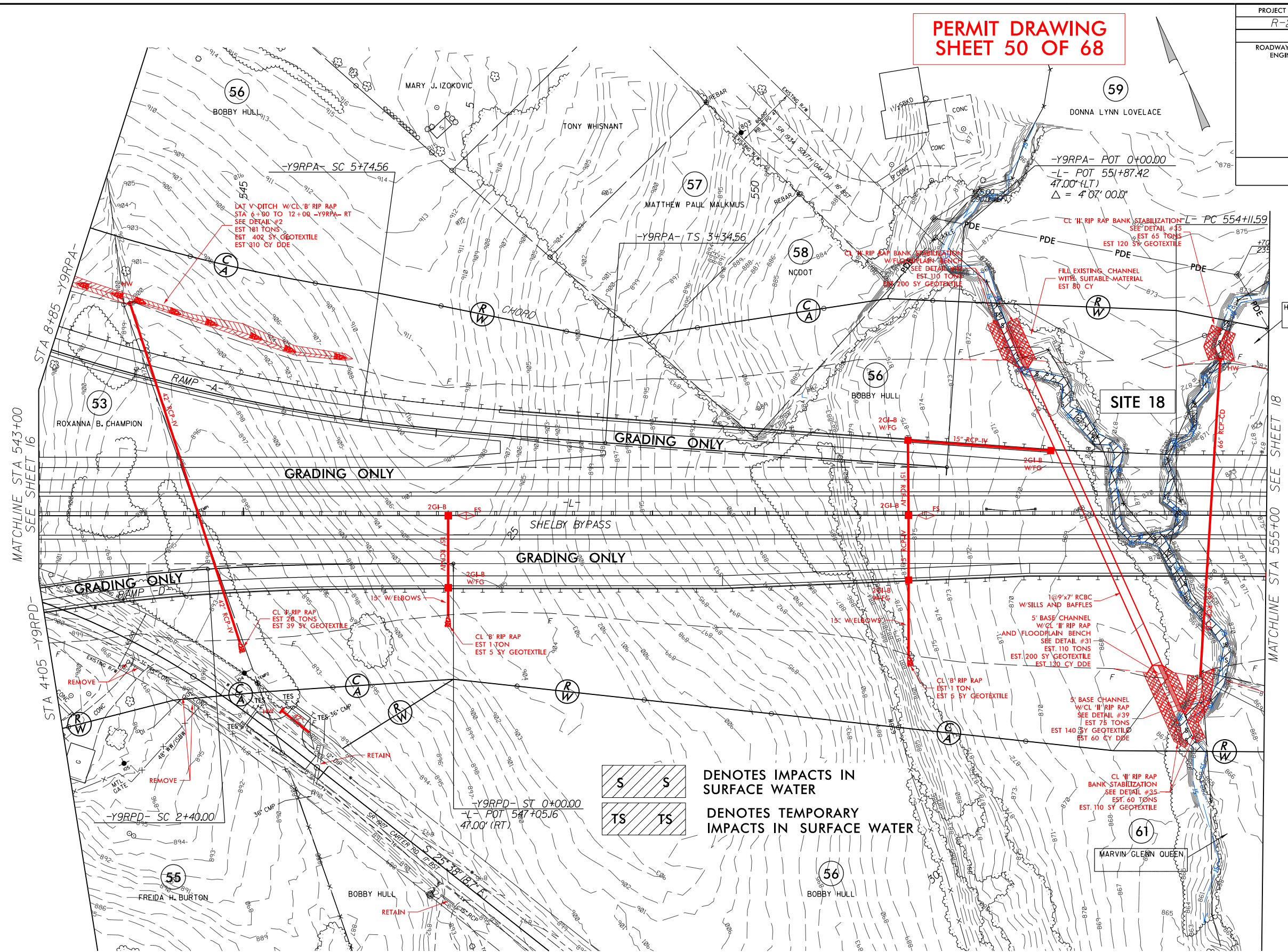
PROJECT REFERENCE NO. R-2707C		SHEET NO. 16f
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		

**PERMIT DRAWING
SHEET 47 OF 68**

30 15 0 30 60
PLANS

PERMIT DRAWING
SHEET 50 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		17
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	



S S
TS TS

DENOTES IMPACTS IN
SURFACE WATER
DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 51
FOR -Y9RPA- PROFILE SEE SHEET 61
FOR -Y9RPD- PROFILE SEE SHEET 64

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	17b
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 51 OF 68

300 200 100 0 100 200 300

CL STA 553+27 -L-
GP EL = 909.14
1@9'x7' RCBC W/SILLS & BAFFLES
SKEW = 66°

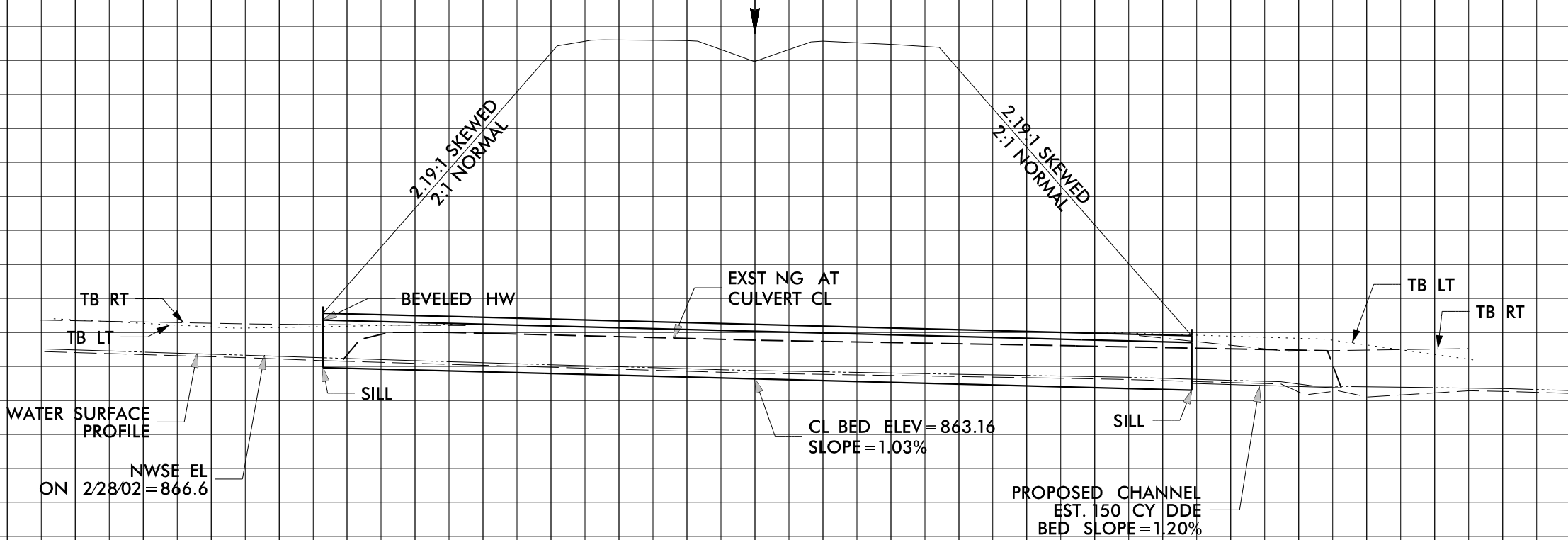
SITE 18

920

900

880

860



1/30/2016
R-2707C Hyd.prm_wet_psh_17b.dgn
10:00 AM

5/14/99

300

200

100

0

100

200

PROJECT REFERENCE NO.

R-2707C

ROADWAY DESIGN
ENGINEER

SHEET NO.

17c

HYDRAULICS
ENGINEER

PERMIT DRAWING
SHEET 52 OF 68

CL STA 554 + 45 -L-
66" RCP

SITE 18

920

915

910

905

900

895

890

885

880

875

870

865

860

855

850

BED ELEV=866.4
INV IN=865.4

66" RCP
SLOPE=1.57%

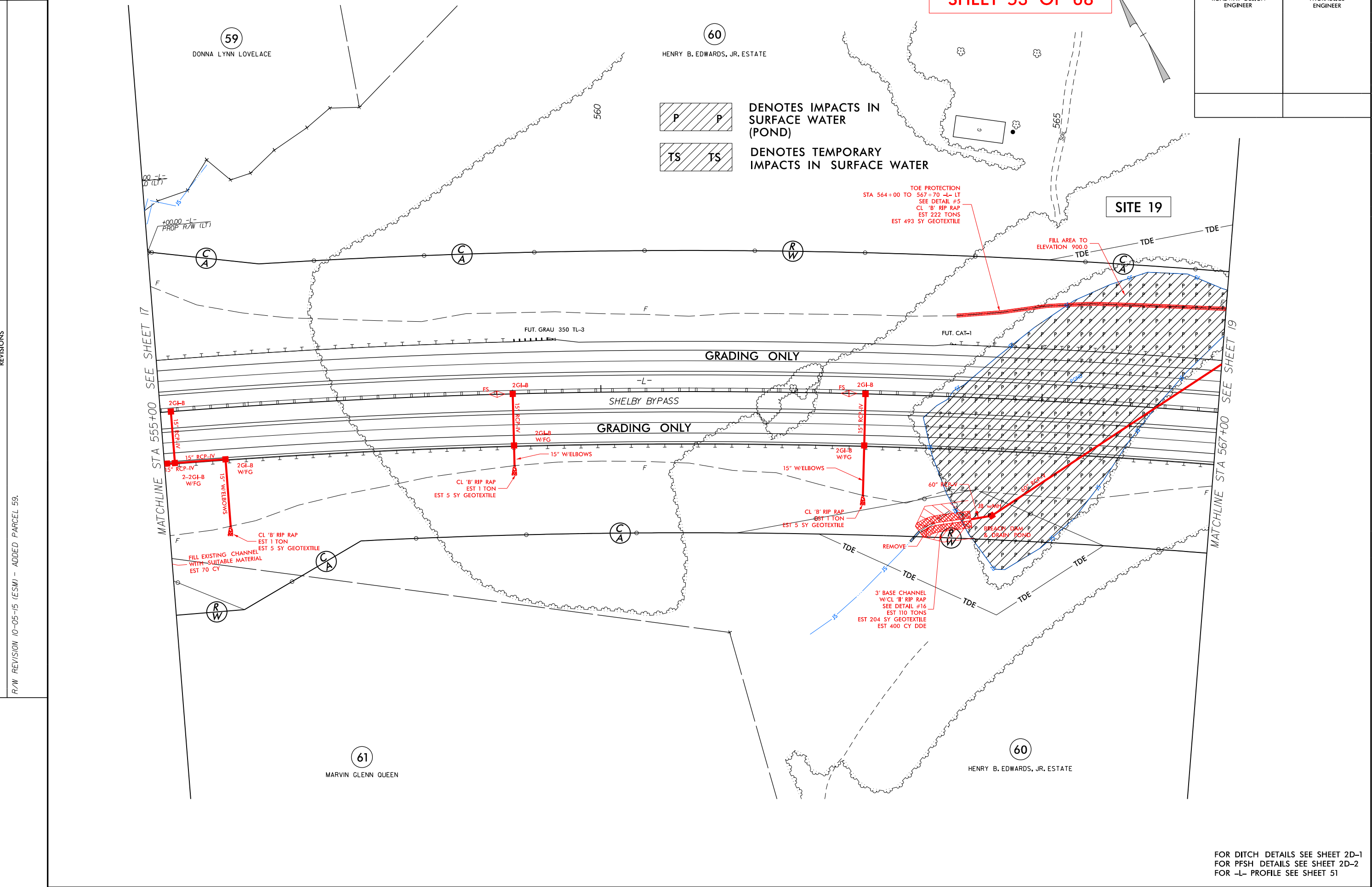
EXST NG AT
66" RCP CL

BED ELEV=862.5
INV OUT=861.5

11/30/2016
R-2707C Hyd.prm_wet.psh_17c.dgn
10:00 AM

REVISIONS

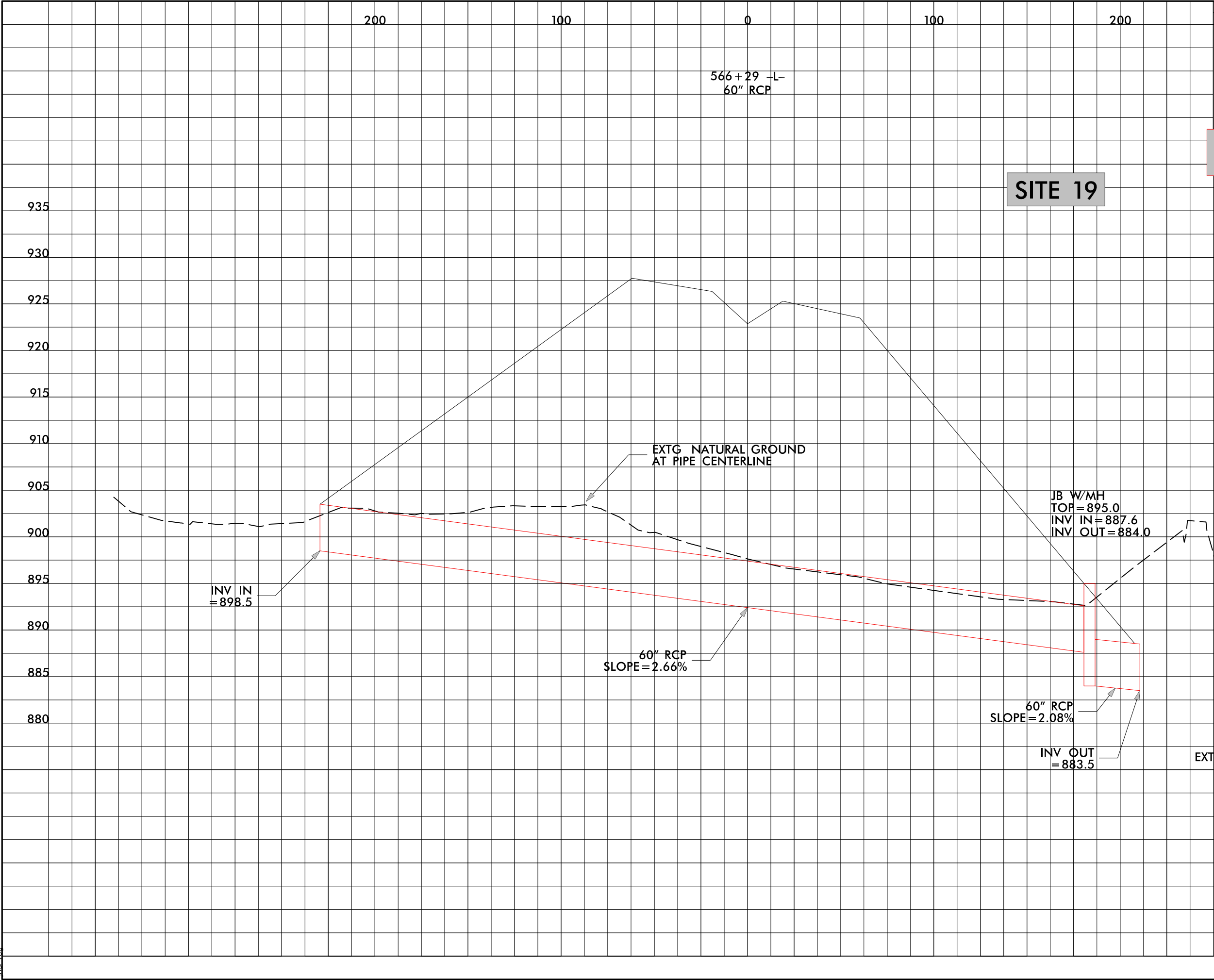
R/W REVISION 10-05-15 (ESM) - ADDED PARCEL 59.



FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 51

5/14/99

11/30/2016
R-2707C Hyd.prm-wet.psh_18b.dgn
18b.dgn

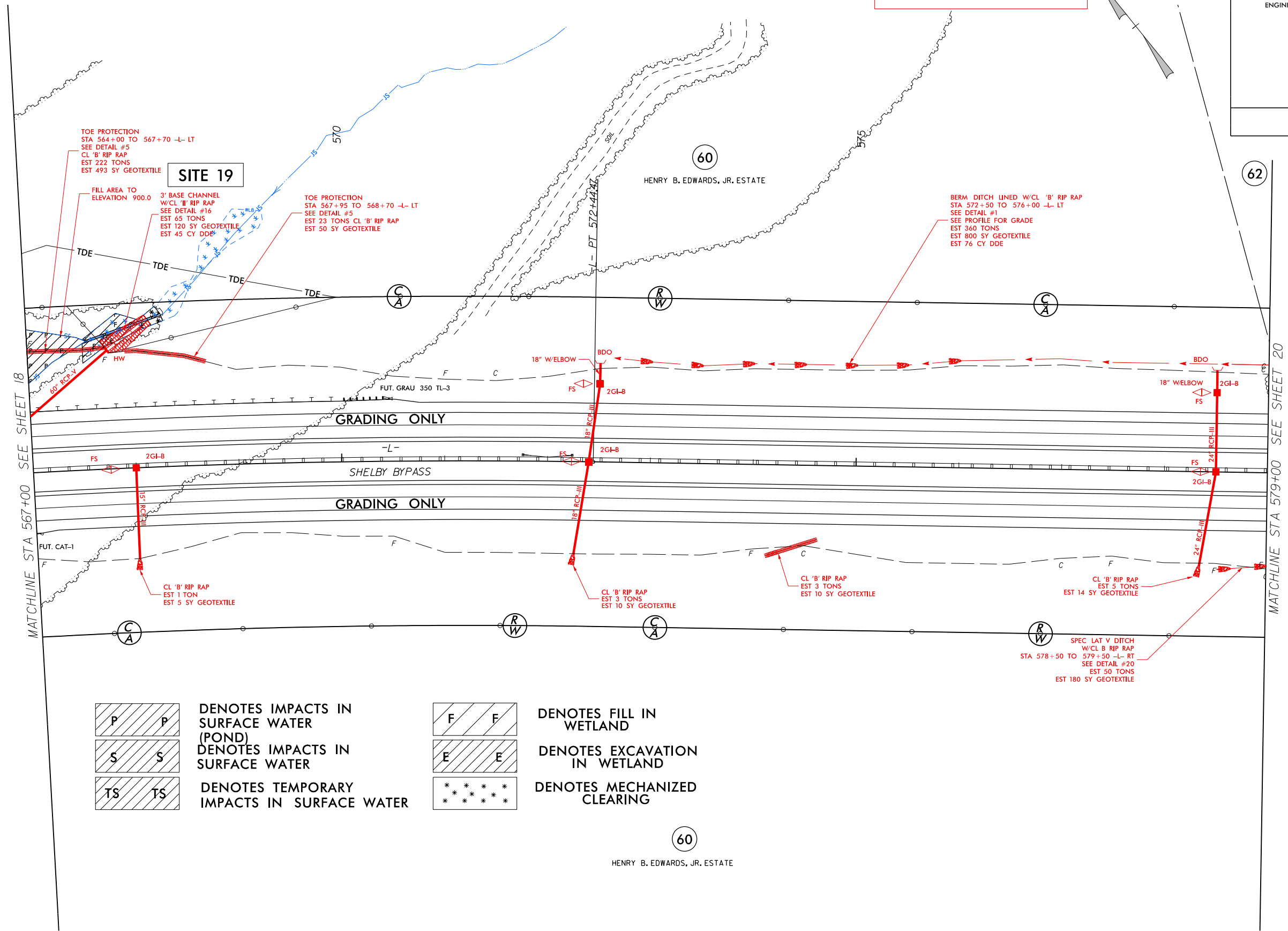


PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		18b	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 55 OF 68

PERMIT DRAWING
SHEET 56 OF 68

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		19
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	



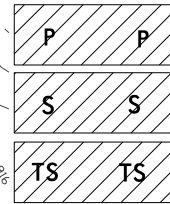
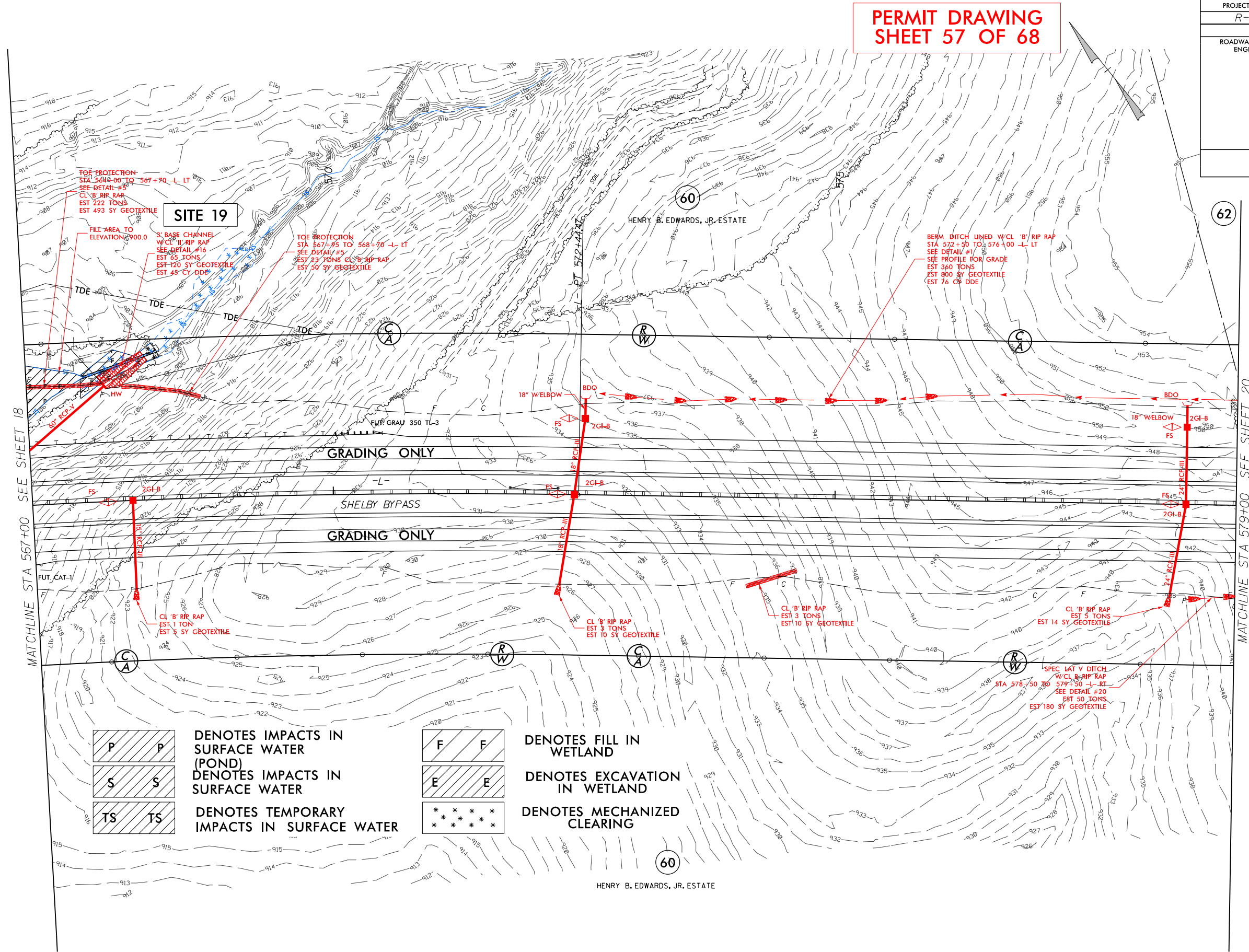
P P	DENOTES IMPACTS IN SURFACE WATER (POND)
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F	DENOTES FILL IN WETLAND
E E	DENOTES EXCAVATION IN WETLAND
* * * * * * * *	DENOTES MECHANIZED CLEARING

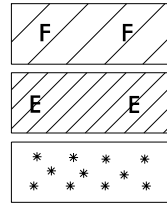
FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 52

PERMIT DRAWING
SHEET 57 OF 68

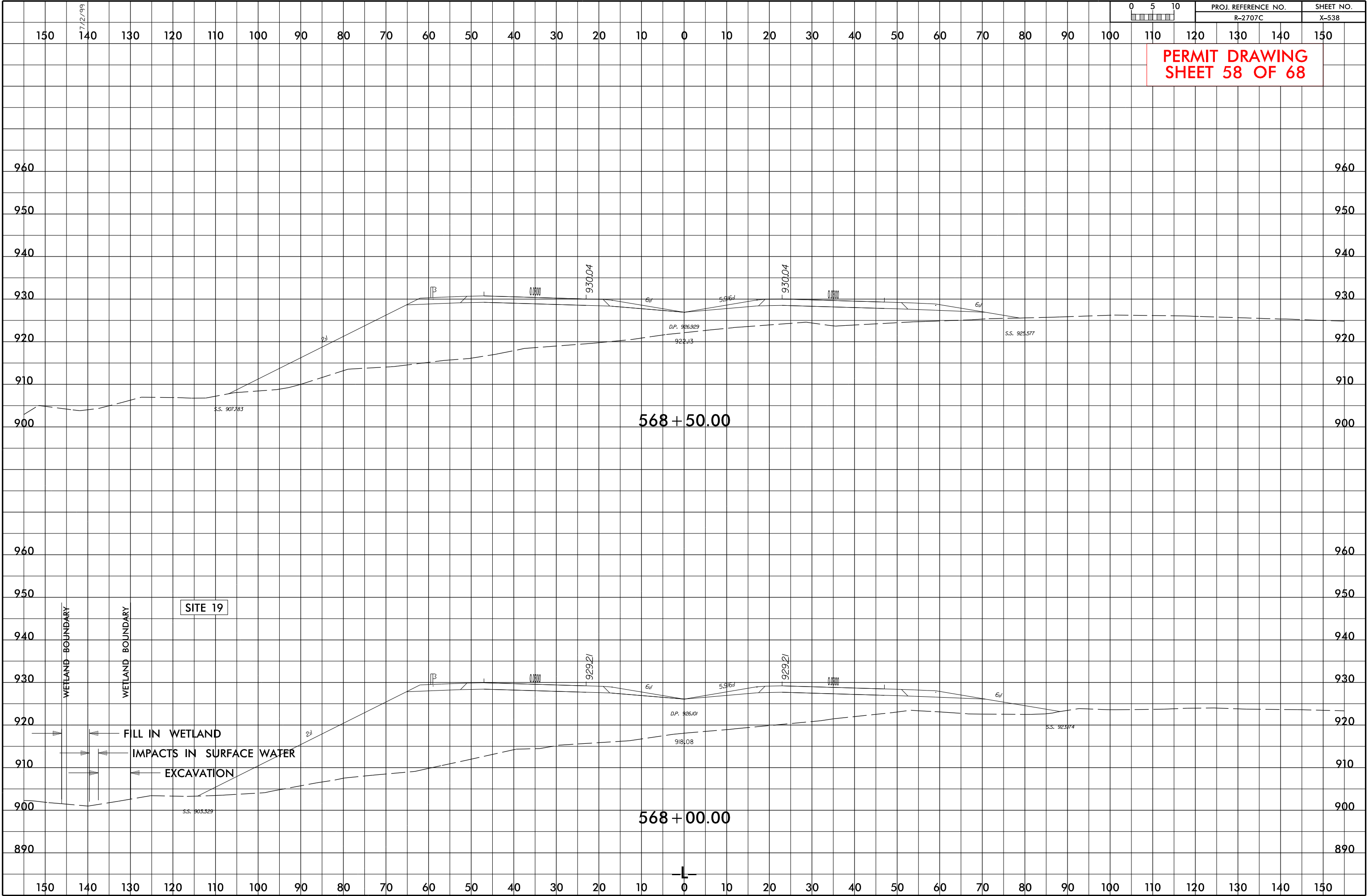
PROJECT REFERENCE NO.	SHEET NO.
R-2707C	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



P DENOTES IMPACTS IN SURFACE WATER (POND)
S DENOTES IMPACTS IN SURFACE WATER
TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

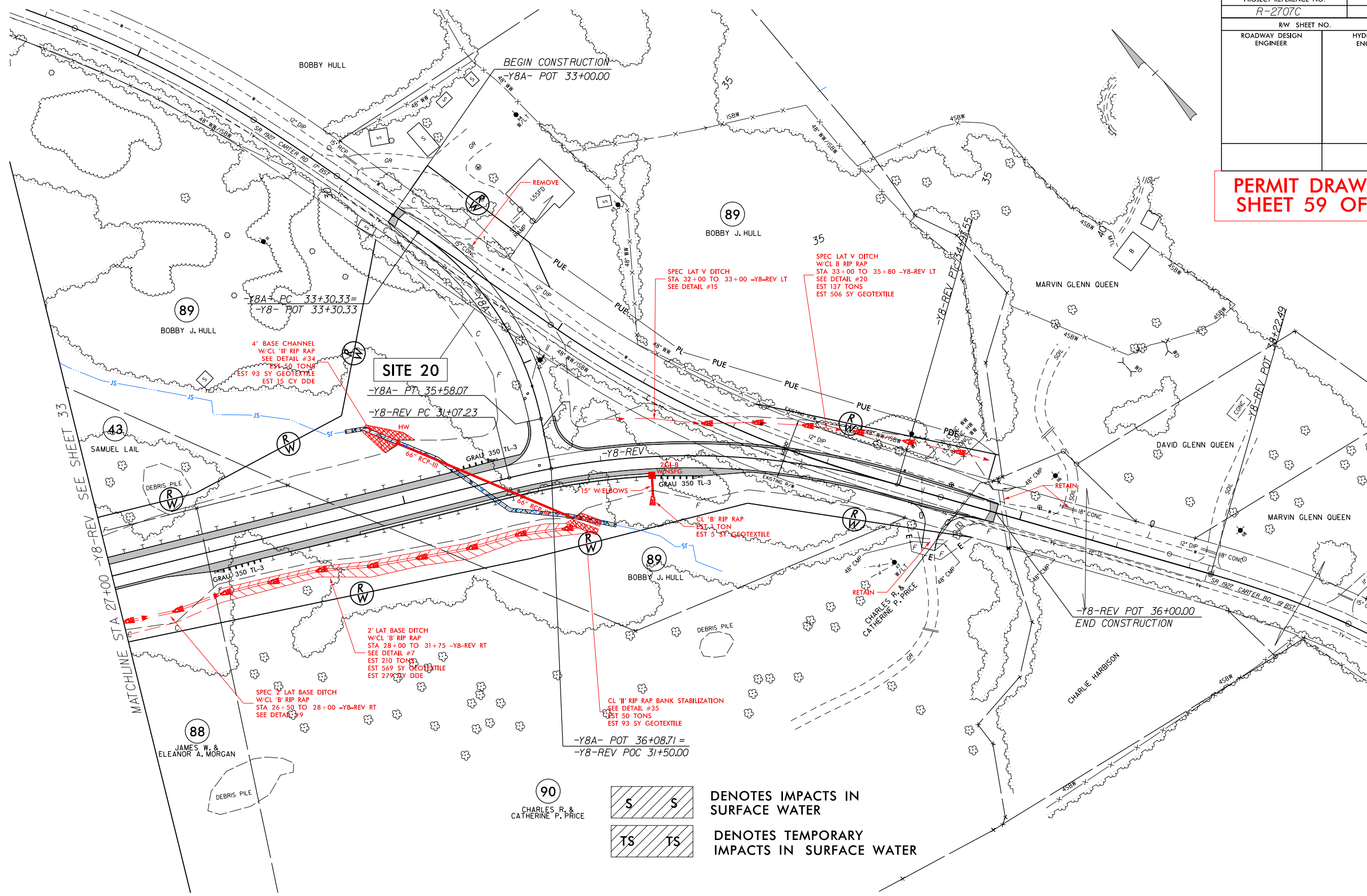


F DENOTES FILL IN WETLAND
E DENOTES EXCAVATION IN WETLAND
* DENOTES MECHANIZED CLEARING

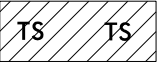


PROJECT REFERENCE NO.	SHEET NO.
R-2707C	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 59 OF 68



DENOTES IMPACTS IN
SURFACE WATER

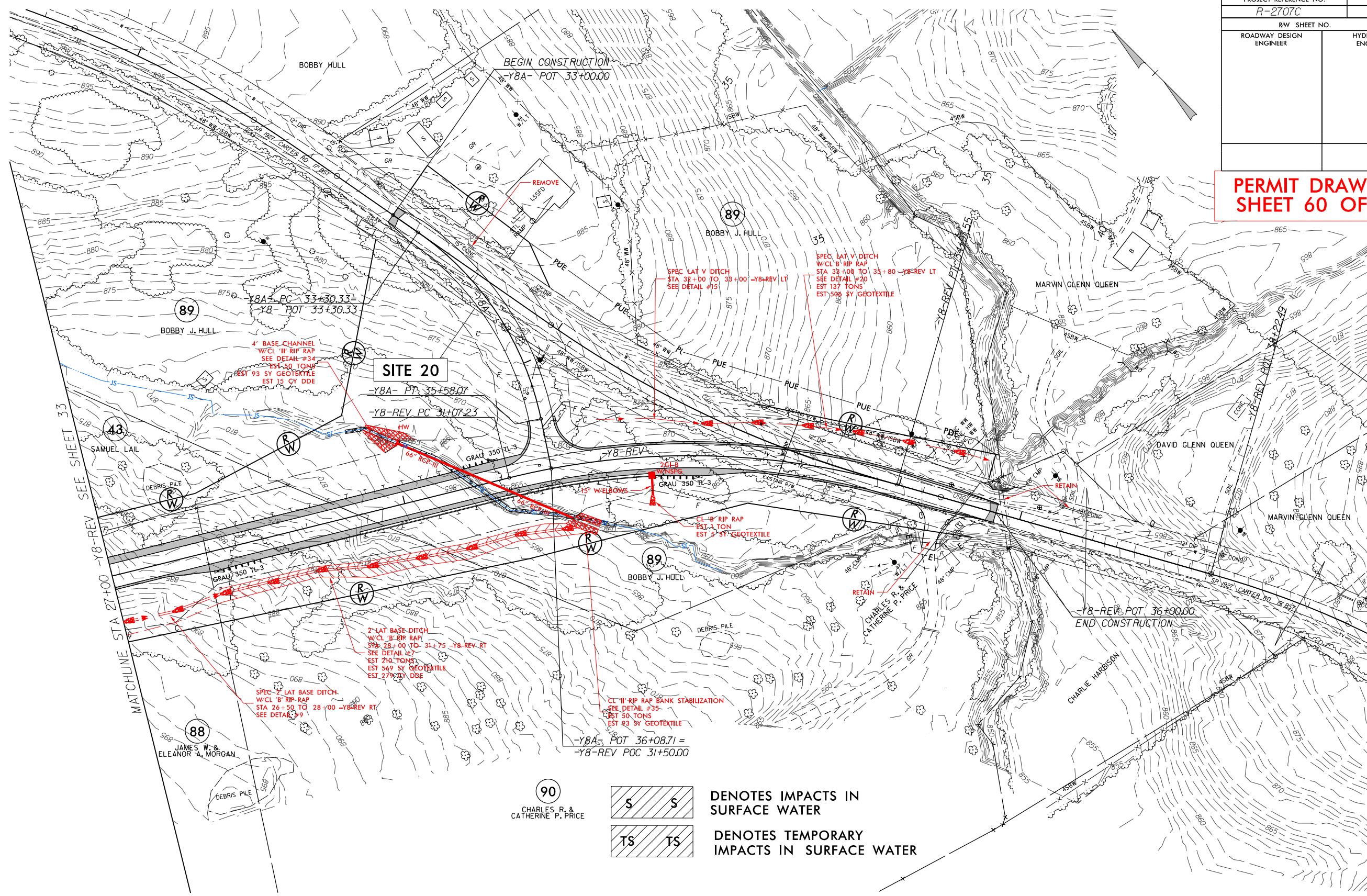


DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

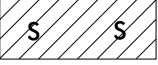
FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -Y8A- PROFILE SEE SHEET 58
FOR -Y8-REV PROFILE SEE SHEET 59

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	34
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

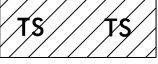
PERMIT DRAWING
SHEET 60 OF 68



90
CHARLES R. &
CATHERINE P. PRICE



DENOTES IMPACTS IN
SURFACE WATER



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -Y8A- PROFILE SEE SHEET 58
FOR -Y8-REV PROFILE SEE SHEET 59

5/14/99

150

100

50

0

50

100

PROJECT REFERENCE NO.

R-2707C

SHEET NO.

34b

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

30+88 -Y8REV-
66" RCP

PERMIT DRAWING
SHEET 61 OF 68

SITE 20

EXTG NATURAL GROUND
AT PIPE CENTERLINE

EXTG BED

INV IN
= 862.5

66" RCP
SLOPE = 3.3%

INV OUT
= 859.2

EXTG BED

885

880

875

870

865

860

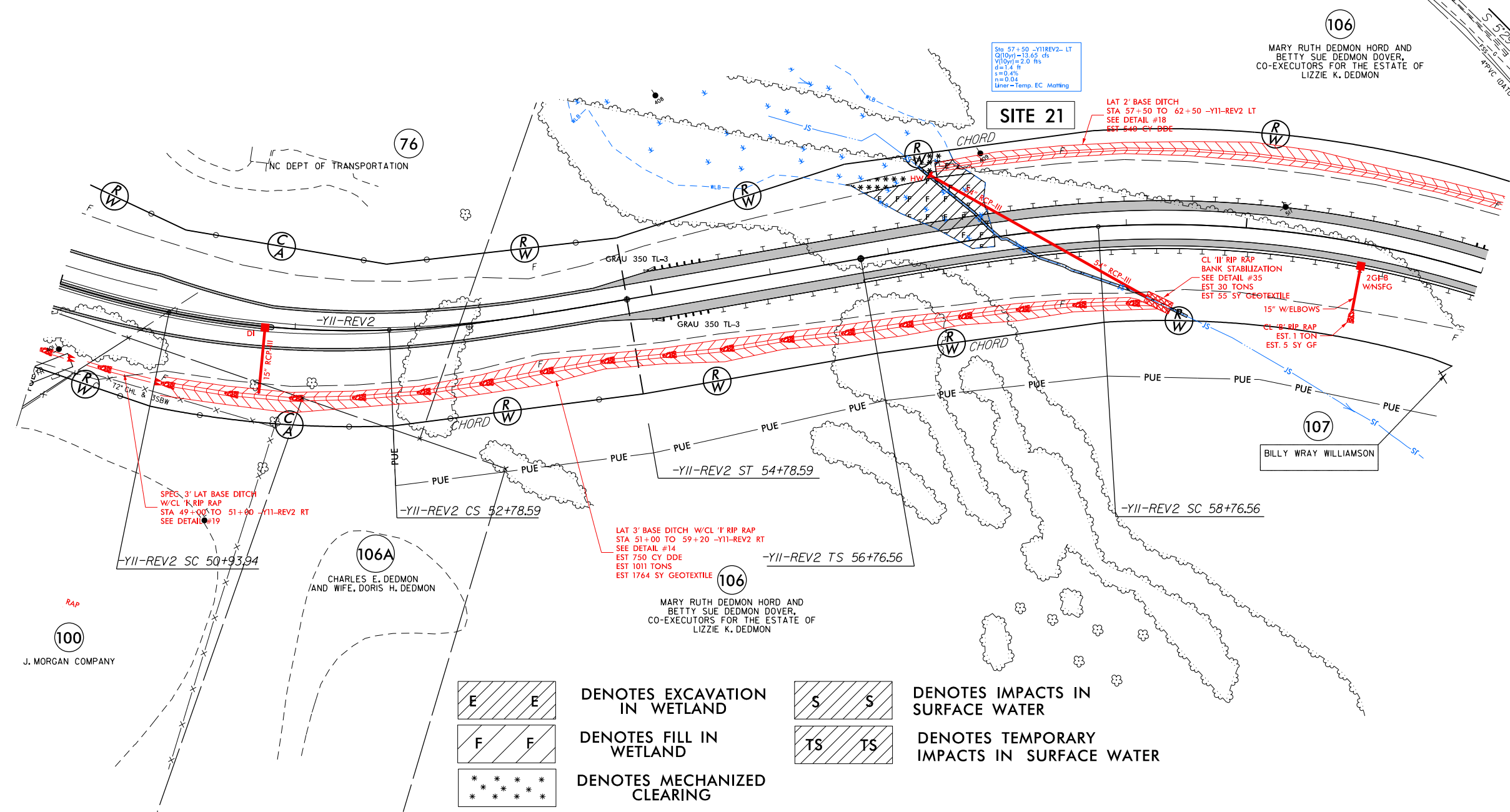
855

850

1/30/2016
R-2707C Hyd.prm-wet.psh-34b.dgn
10:00 AM

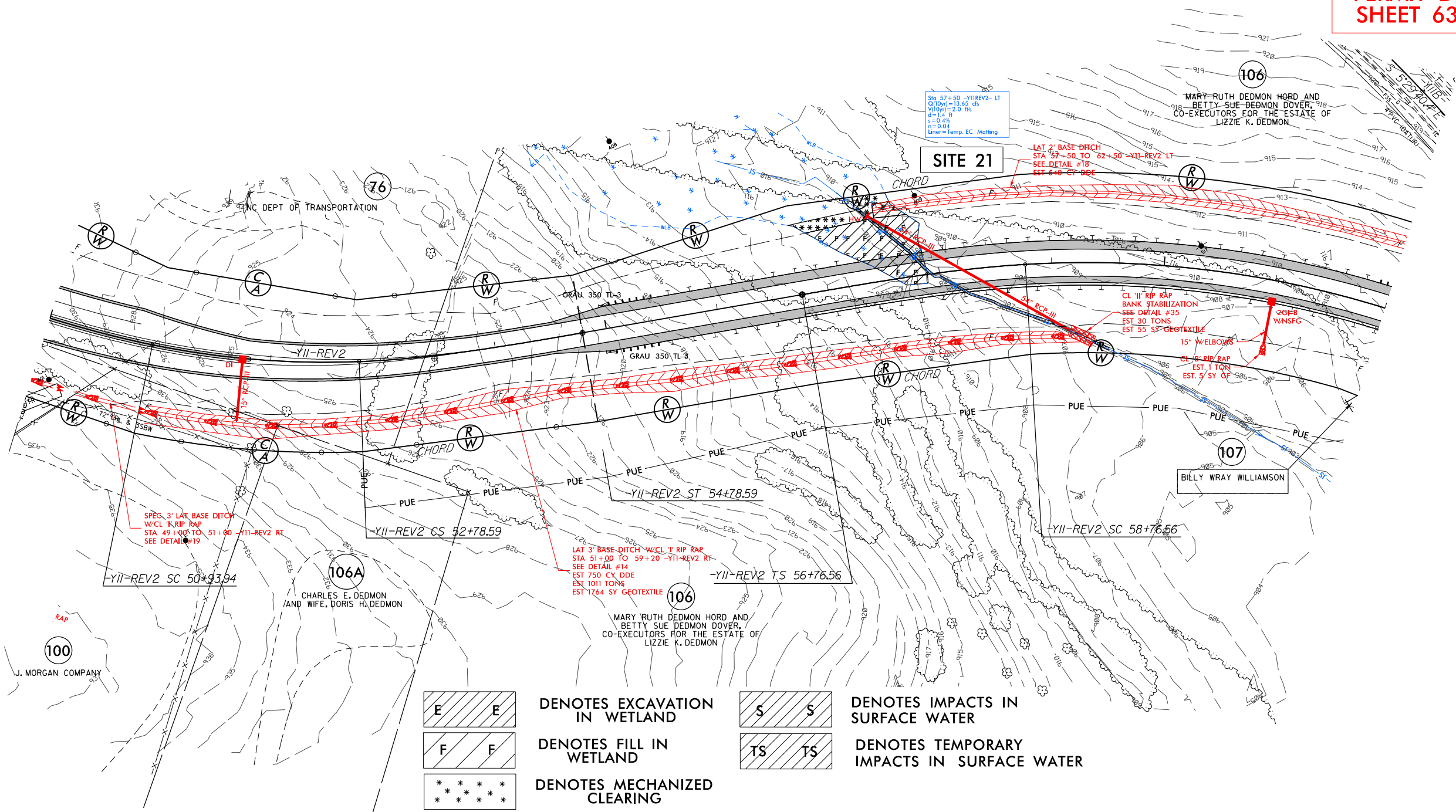
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		39
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

**PERMIT DRAWING
SHEET 62 OF 68**

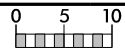


PROJECT REFERENCE NO.		SHEET NO.
R-2707C		39
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 63 OF 68



7/2/99



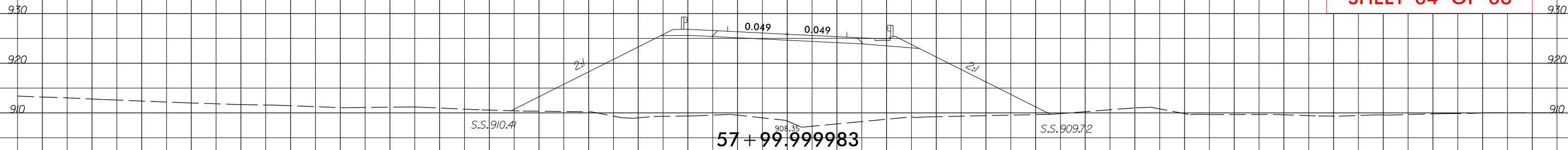
PROJ. REFERENCE NO.

R-2707C

SHEET NO.

X-776

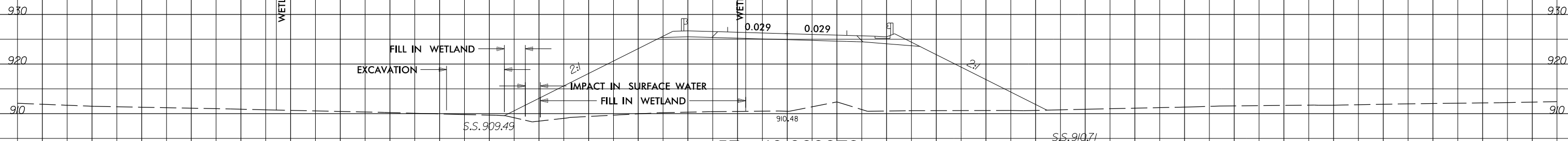
PERMIT DRAWING
SHEET 64 OF 68


$$57 + 99.999983$$

WETLAND BOUNDARY

WETLAND BOUNDARY

SITE 21



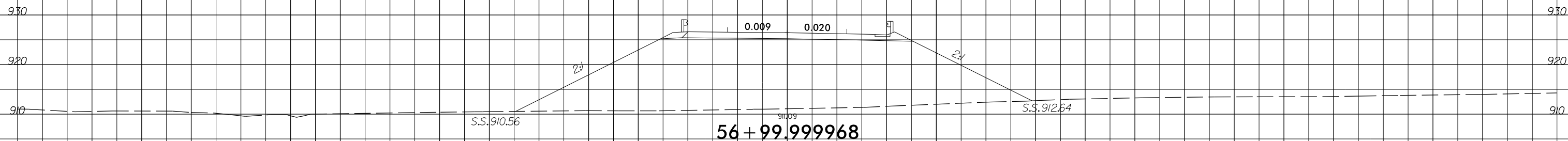
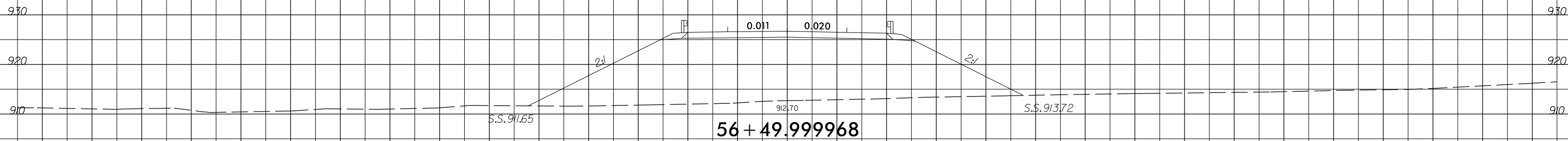
FILL IN WETLAND

EXCAVATION

IMPACT IN SURFACE WATER

- FILL IN WETLAND

57	+	49.999973
----	---	-----------


$$56 + 99.999968$$


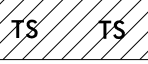
56	+	49.999968
----	---	-----------

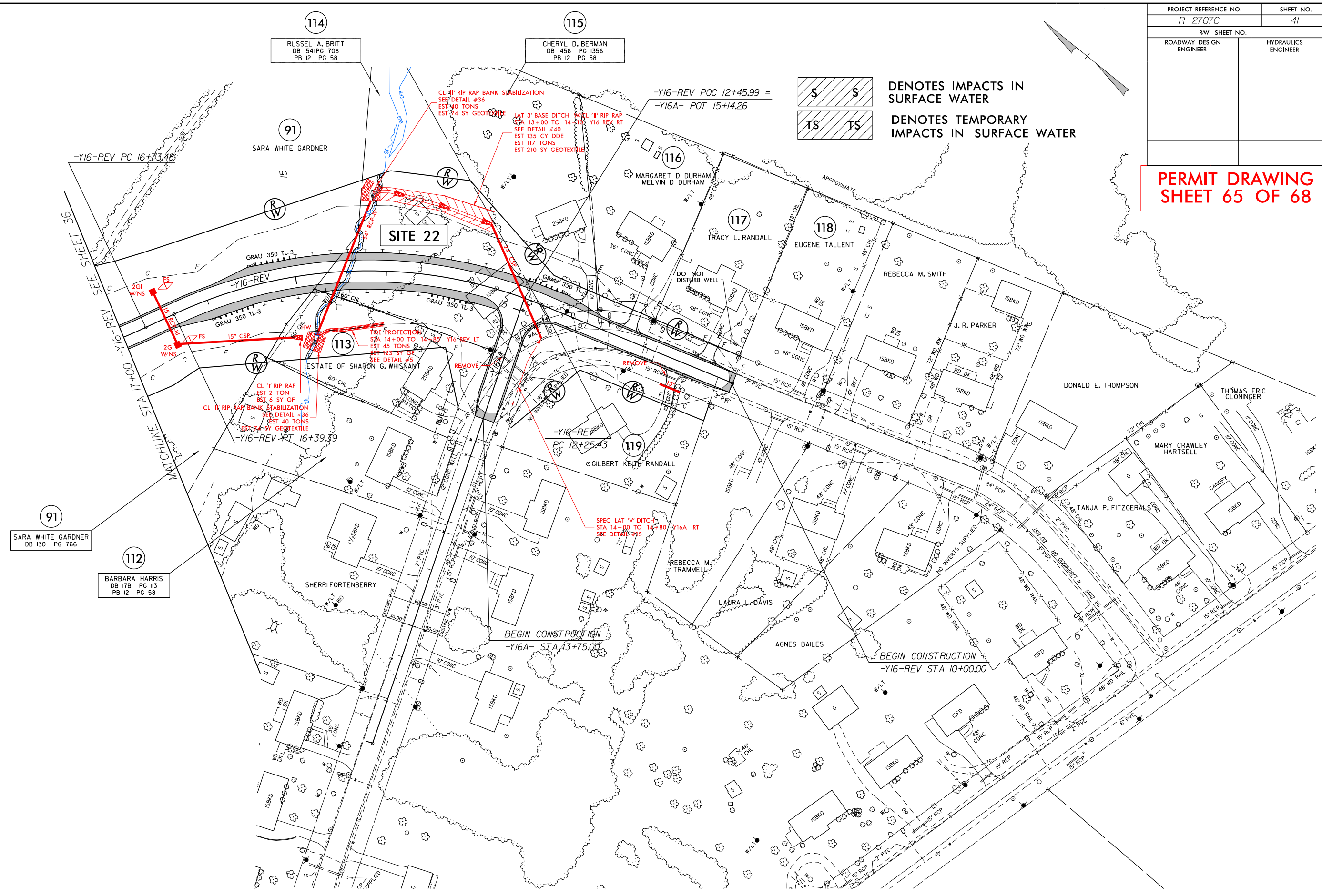
-Y// -REV2

11/30/2016
R2707C-Hyd-prm-wet-psh-39b.dgn
jharvey

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		41
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 65 OF 68

 DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 116 - CHANGED PROPERTY OWNER NAME INFORMATION.
R/W REVISION 10-05-15 (ESM) - PARCEL 113 - CHANGED PROPERTY OWNER NAME INFORMATION.
R/W REVISION 10-15-15 (ESM) - PARCEL 117 - ADDED "DO NOT DISTURB WELL" TO PARCEL

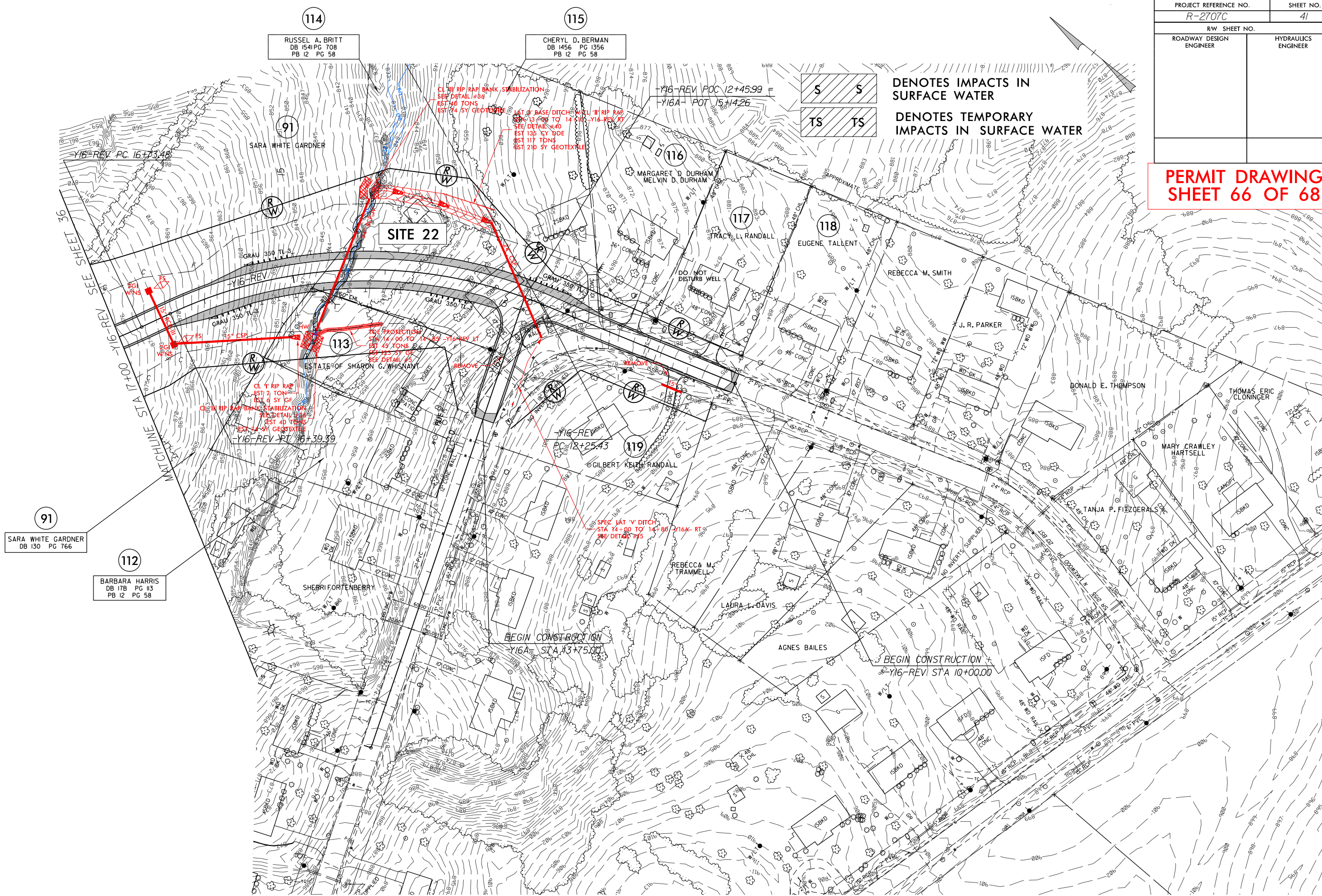
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		41
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 66 OF 68

S S
TS TS

DENOTES IMPACTS IN
SURFACE WATER

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER



REVISIONS

R/W REVISION 9-2-15 (PCP) - PARCEL 116 - CHANGED PROPERTY OWNER NAME INFORMATION.
R/W REVISION 10-05-15 (ESM) - PARCEL 113 - CHANGED PROPERTY OWNER NAME INFORMATION.
R/W REVISION 10-15-15 (ESM) - PARCEL 117 - ADDED 'DO NOT DISTURB WELL' TO PARCEL

WETLAND PERMIT IMPACT SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	384+50 -L-	BRIDGE							0.05		30	
		BANK STABILIZATION						< 0.01		19		
2	405+99 -L-	66" RCP						0.04	< 0.01	358	60	
		BANK STABILIZATION						< 0.01		22		
3	414+88 -L-	42" RCP						0.02	< 0.01	322	30	
		BANK STABILIZATION						< 0.01		39		
4	425+38-426+75 -L-	72" RCP						0.04	< 0.01	340	31	
		BANK STABILIZATION						0.01		55		
5	438+67-439+29-L-LT	66" RCP	0.02					0.02	< 0.01	163	16	
		BANK STABILIZATION						< 0.01		25		
6	438+70 -L- RT	DRAIN POND	0.19									
7	453+03 -L-	1@8'x8' RCBC						0.10	< 0.01	498	26	
		BANK STABILIZATION						0.01		50		
8	475+69-477+08 -L-	48" RCP	< 0.01					0.01	< 0.01	245	31	
		BANK STABILIZATION						< 0.01		33		
9	489+60 -L- LT	ROAD FILL						< 0.01		163		
10	490+88 -L-	66" RCP						0.05	< 0.01	328	26	
		BANK STABILIZATION						< 0.01		44		
11	495+03-491+14 -L-	54" RCP						0.02	< 0.01	294	18	
12	503+77 -L- RT	DRAIN WETLAND / 54" RCP	0.14					< 0.01		161		
13	502+82-513+25-L-LT	ROAD FILL						0.14	< 0.01	1274	22	
SUBTOTALS*:			0.36					0.50	0.08	4433	290	

*Rounded totals are sum of actual impacts

NOTES:
SITE 6: Total Take Pond = 0.99 Acre Impacts in Surface Waters
SITE 8: Total Take Wetland

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12-2-16
CLEVELAND COUNTY
R-2707C
34497.2.FS9
SHEET 67 OF 68

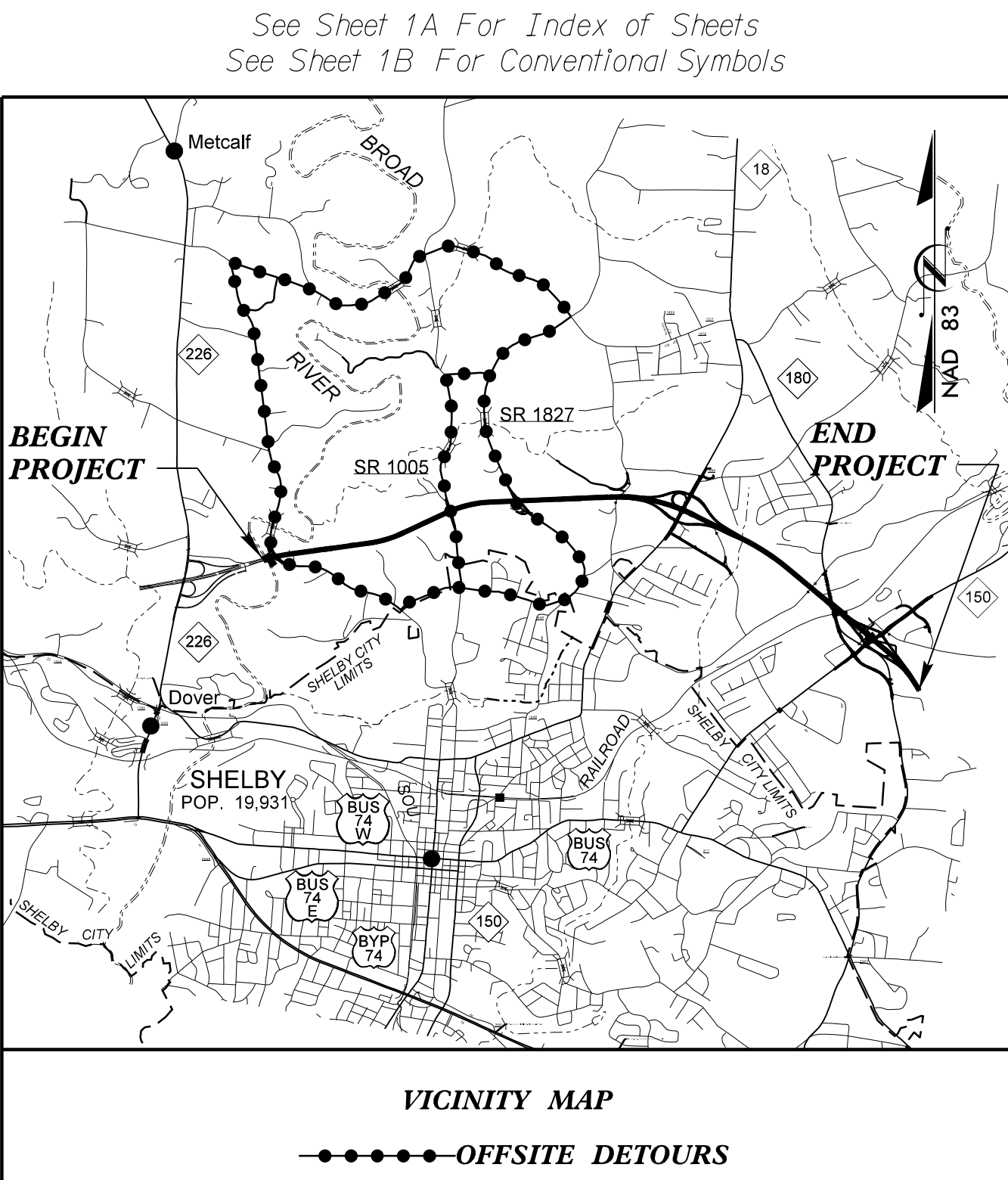
WETLAND PERMIT IMPACT SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
14	510+98-513+02-L-	ROAD FILL						0.02	< 0.01	384	15	
15	11+01 -Y9RPB-	36" RCP						< 0.01	< 0.01	176	32	
		BANK STABILIZATION						< 0.01		17		
16	15+19-17.97-Y9RPA-	60" RCP	0.45					0.02	< 0.01	453	86	
		BANK STABILIZATION						< 0.01		20		
17	536+93-541+15-L-LTRT	66" RCP						0.03	< 0.01	533	38	
		BANK STABILIZATION						< 0.01		35		
18	554+00-L-	1@9'x7' RCBC + 66" RCP						0.11	< 0.01	695	25	
		BANK STABILIZATION						0.01		69		
		CHANNEL IMPROVEMENT						< 0.01		52		
19	563+95-568+18-L-	60" RCP/DRAIN POND	0.02		< 0.01	< 0.01		< 0.01	< 0.01	64	29	
20	29+65-32+04-Y8REV-	66" RCP						0.02	< 0.01	235	31	
		BANK STABILIZATION						< 0.01		27		
21	56+75-59+37-Y11REV2-	54" RCP	0.08		< 0.01	0.02		< 0.01	< 0.01	211	27	
		BANK STABILIZATION						< 0.01		23		
22	14+-15+00-Y16REV-	54" RCP						0.02	< 0.01	177	25	
		BANK STABILIZATION						< 0.01		40		
SUBTOTALS FROM PAGE 1*:			0.36					0.50	0.08	4433	290	
SUBTOTALS FROM PAGE 2*:			0.55		0.01	0.02		0.25	0.02	3211	308	
TOTALS*:			0.91		0.01	0.02		0.75	0.10	7644	598	

*Rounded totals are sum of actual impacts

NOTES:
SITE 16: Total Take Wetland
SITE 19: Total Take Pond = 1.43 Acre Impacts in Surface Waters

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12-2-16
CLEVELAND COUNTY
R-2707C
34497.2.FS9
SHEET 68 OF 68

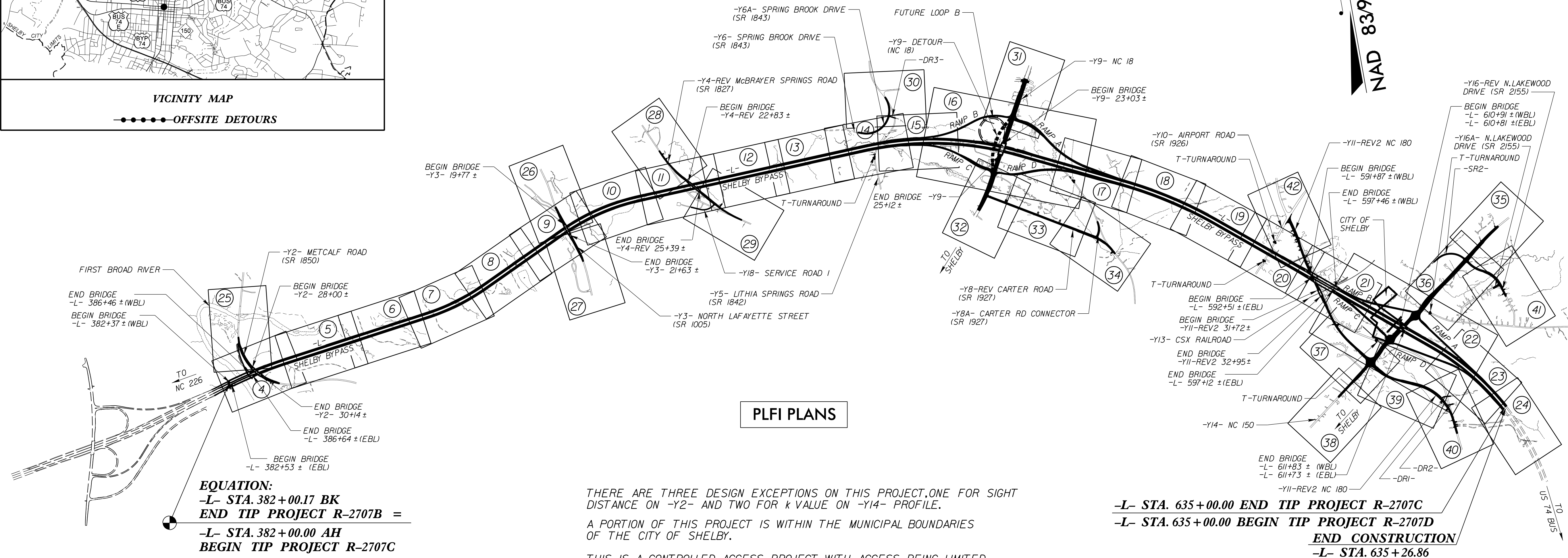
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34497.1.2	NHF-74(14)	P.E.	
34497.2.FS9	NHF-0074(152)	ROW	
34497.2.U4	NHF-0074(152)	UTILITY	



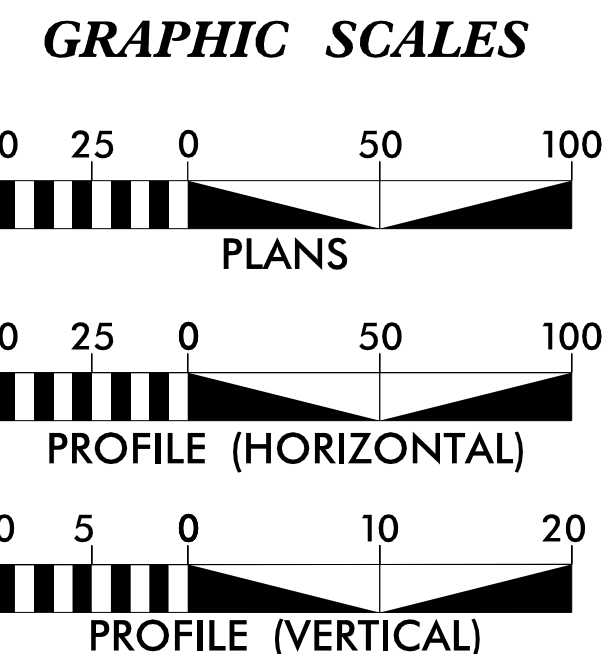
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CLEVELAND COUNTY

**LOCATION: US 74 SHELBY BYPASS FROM EAST OF NC 226
TO EAST OF NC 150**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING,
AND STRUCTURES**



NCDOT CONTACT: BRENDA MOORE, PE



DESIGN DATA	
ADT 2017 =	21,010
ADT 2037 =	35,110
DHV =	11 %
D =	55 %
T =	14 % *
V =	70 MPH
FUNC CLASS =	FREEWAY
(* TTST 9% DUAL 5%)	STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY STATE PROJECT R-2707C	= 4.591 MILES
LENGTH OF STRUCTURES STATE PROJECT R-2707C	= 0.201 MILES**
LENGTH OF STATE PROJECT R-2707C	= 4.792 MILES
**NOTE : LENGTH BASED ON WBL BRIDGES	

Prepared for NCDOT in the Office of:
moффatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
PE (F-0105)

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
November 21, 2014

LETTING DATE:
May 16, 2017

TIM R. REID, P.E.
PROJECT ENGINEER

TRENT E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

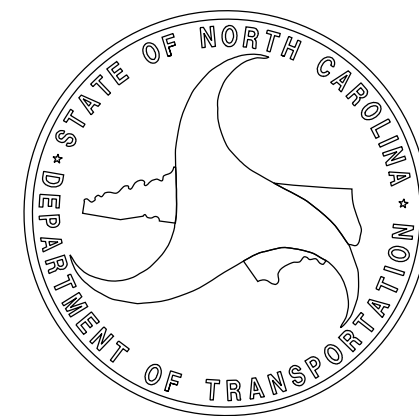
HYDRAULICS ENGINEER
SDG
Sungate Design Group, P.A.
Engineers - Landscape Architecture - Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606

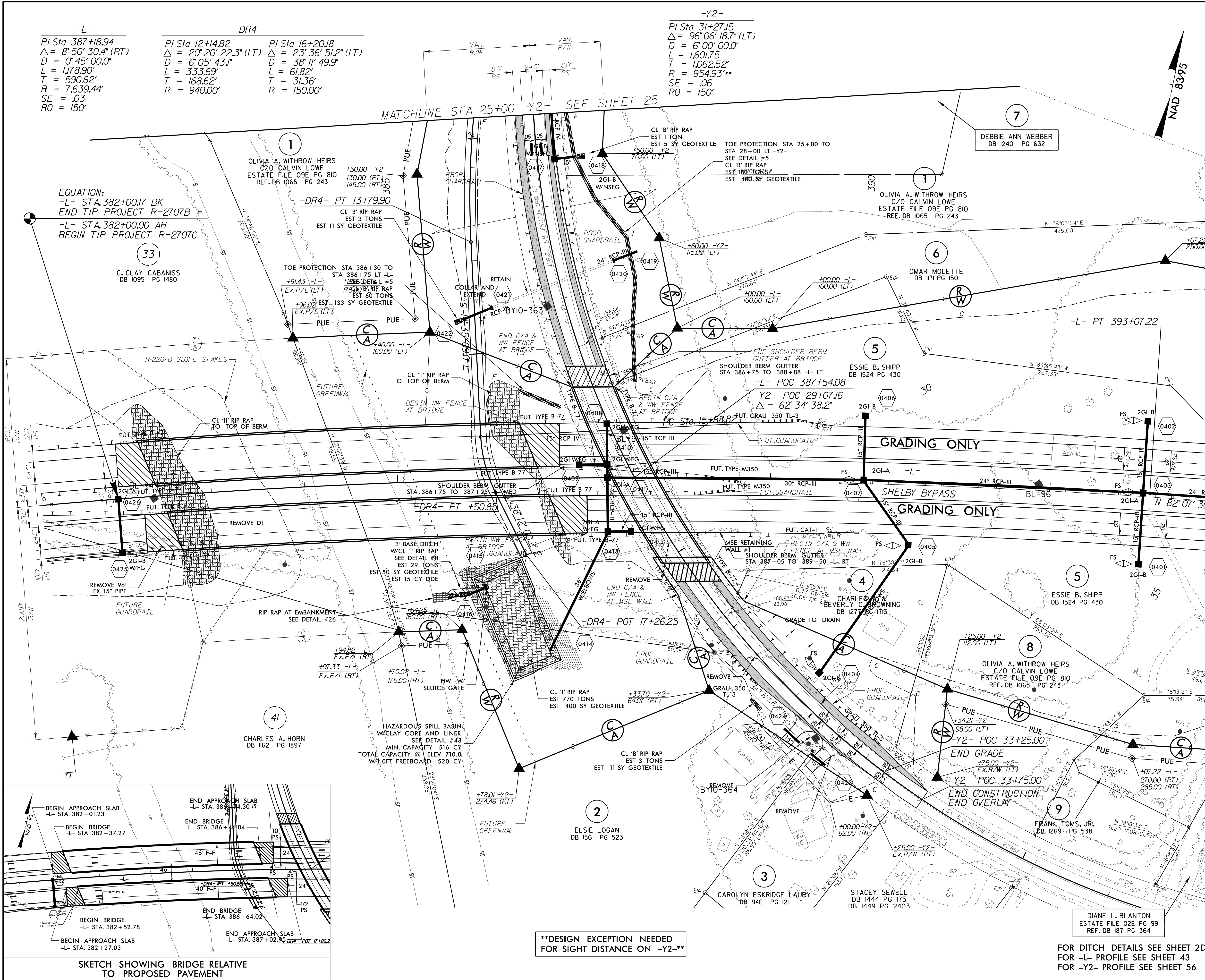
SIGNATURE: _____ **P.E.**

ROADWAY DESIGN ENGINEER

moффatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
PE (F-0105)

SIGNATURE: _____ **P.E.**





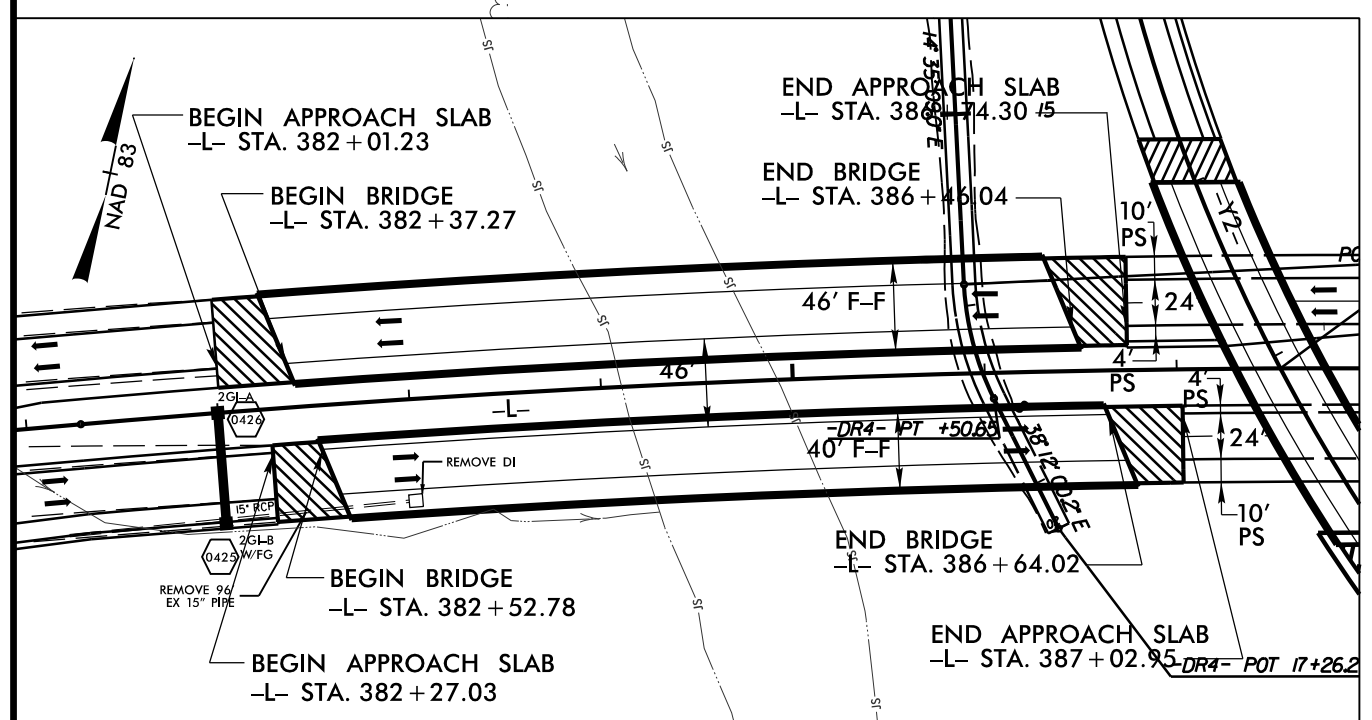
-L-
PI Sta 387+18.94
Δ = 8° 50' 30.4" (RT)
D = 0° 45' 00.0"
L = 1,178.90'
T = 590.62'
R = 7,639.44'
SE = .03
RO = 150'

-DR4-
PI Sta 12+14.82
Δ = 20° 20' 22.3" (LT)
D = 6° 05' 43.1"
L = 333.69'
T = 168.62'
R = 940.00'

PI Sta 16+20.18
Δ = 23° 36' 51.2" (LT)
D = 38° 11' 49.9"
L = 61.82'
T = 31.36'
R = 150.00'

-Y2-
PI Sta 31+27.15
Δ = 96° 06' 18.7" (LT)
D = 6° 00' 00.0"
L = 1,601.75'
T = 1,062.52'
R = 954.93'***
SE = .06
RO = 150'

EQUATION:
-L- STA.382+00.7 BK
END TIP PROJECT R-2707B
-L- STA.382+00.00 AH
BEGIN TIP PROJECT R-2707C

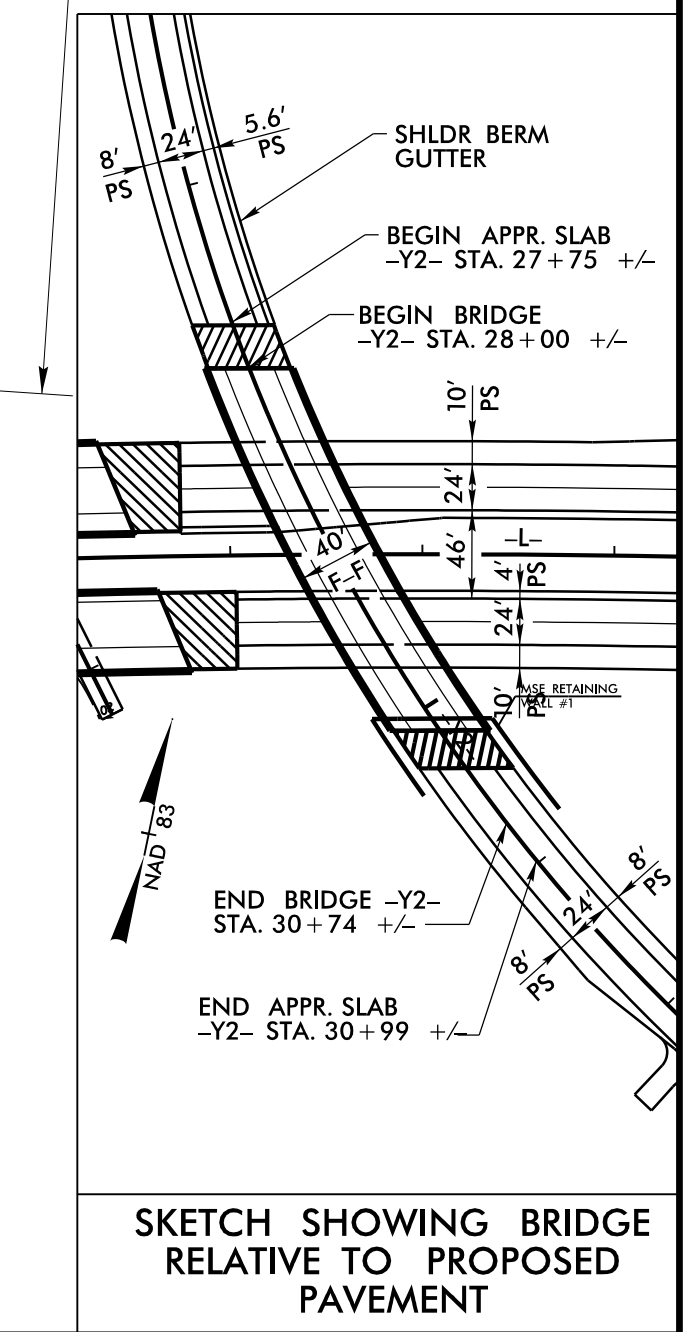


SKETCH SHOWING BRIDGE RELATIVE TO PROPOSED PAVEMENT

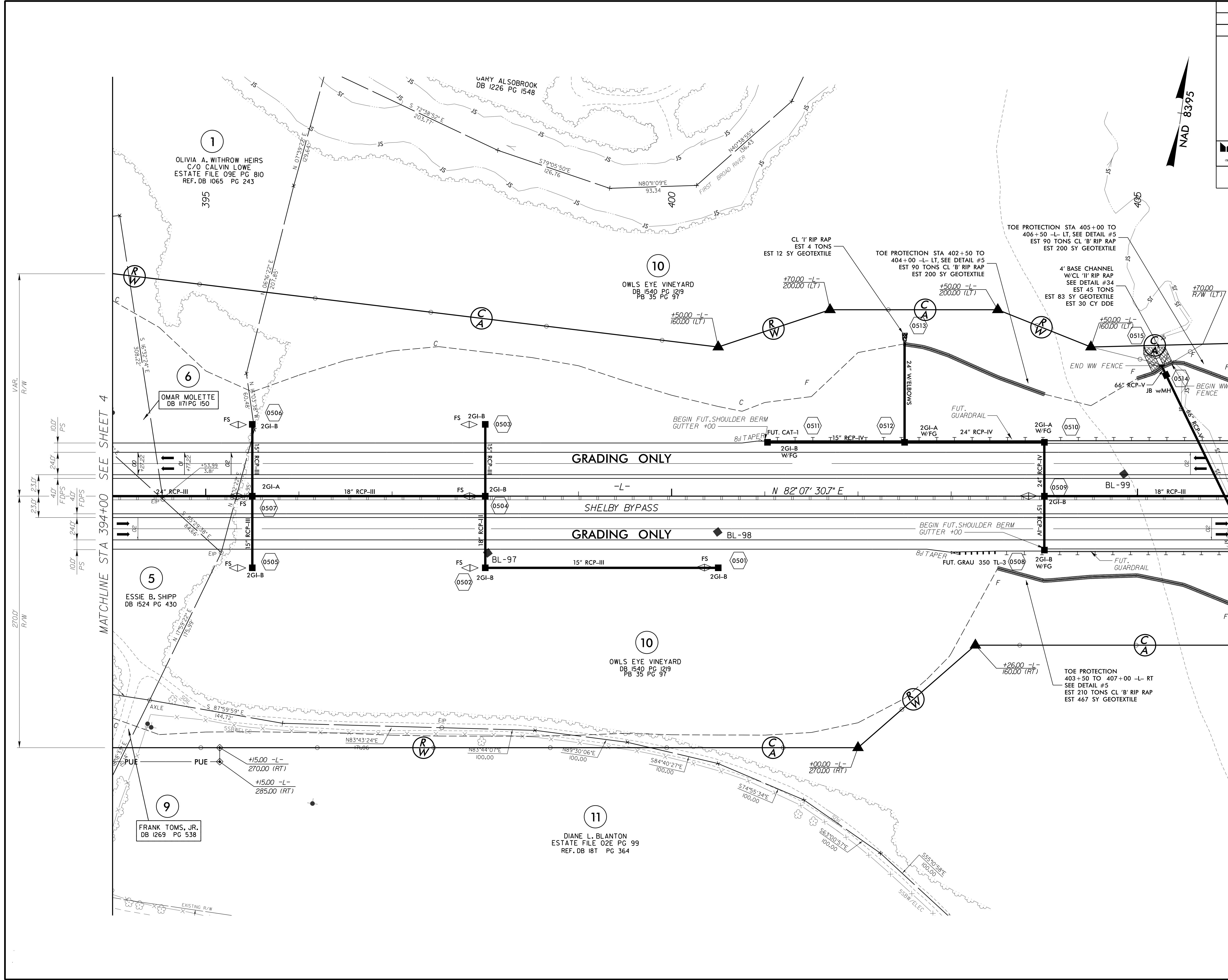
DESIGN EXCEPTION NEEDED FOR SIGHT DISTANCE ON -Y2-

FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 43
FOR -Y2- PROFILE SEE SHEET 56

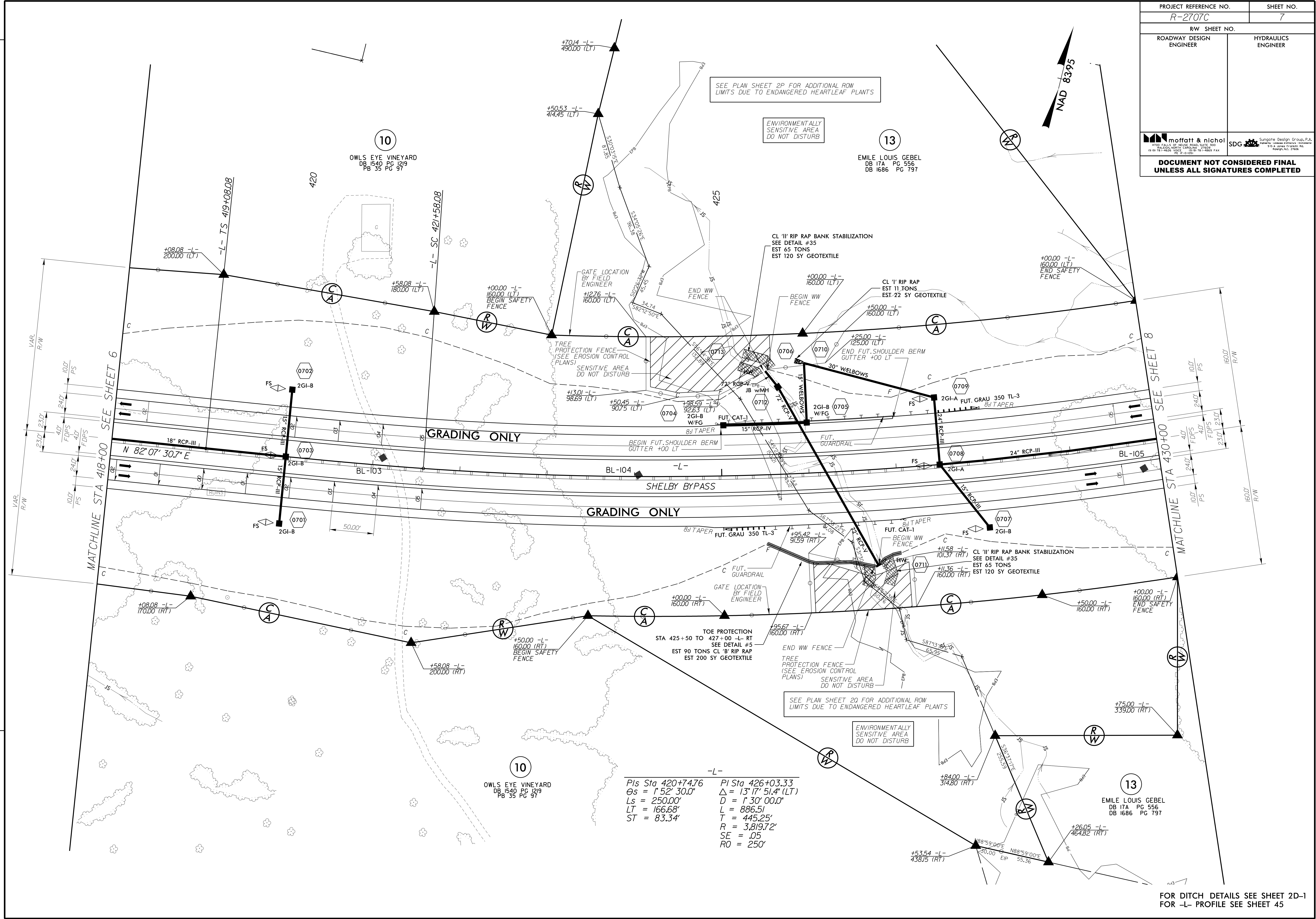
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		4
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
moffatt & nichol 4100 FALLS OF NEUSE ROAD, SUITE 200 FARMERSVILLE, NC 27834 TEL: 714-462-1000 FAX: 714-462-1001		SDG Sundate Design Group, P.A. 1000 JONES FERRY RD. RALEIGH, NC 27601
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



SKETCH SHOWING BRIDGE RELATIVE TO PROPOSED PAVEMENT

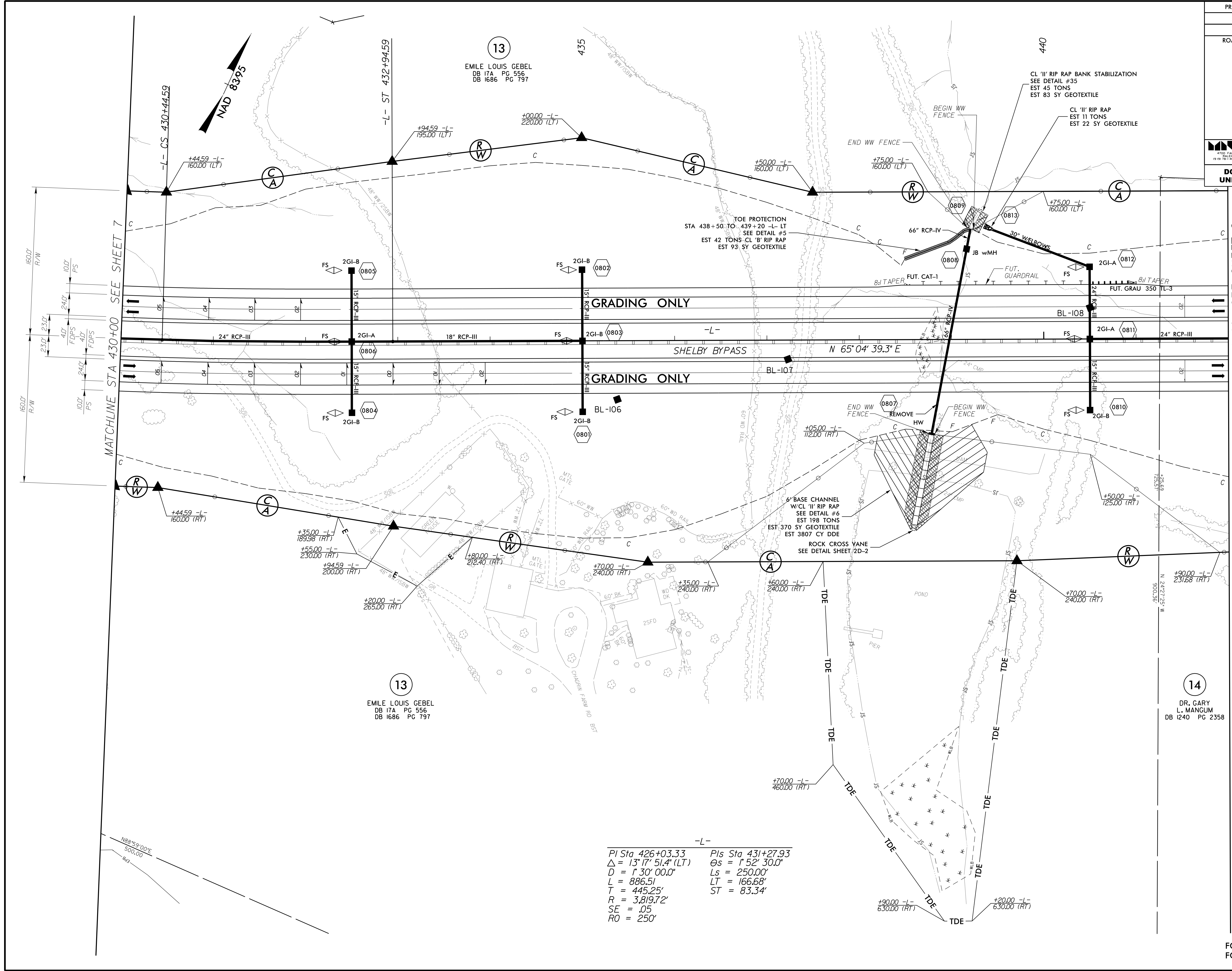


PROJECT REFERENCE NO.		SHEET NO.
R-2707C		7
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1700 FAULK, DR. SUITE 200, SUITE 200 RALEIGH, NC 27601 919-781-7800 FAX 919-781-7809		 SDG Sundt Design Group, P.A. 10101 JONES FERRY RD. RALEIGH, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

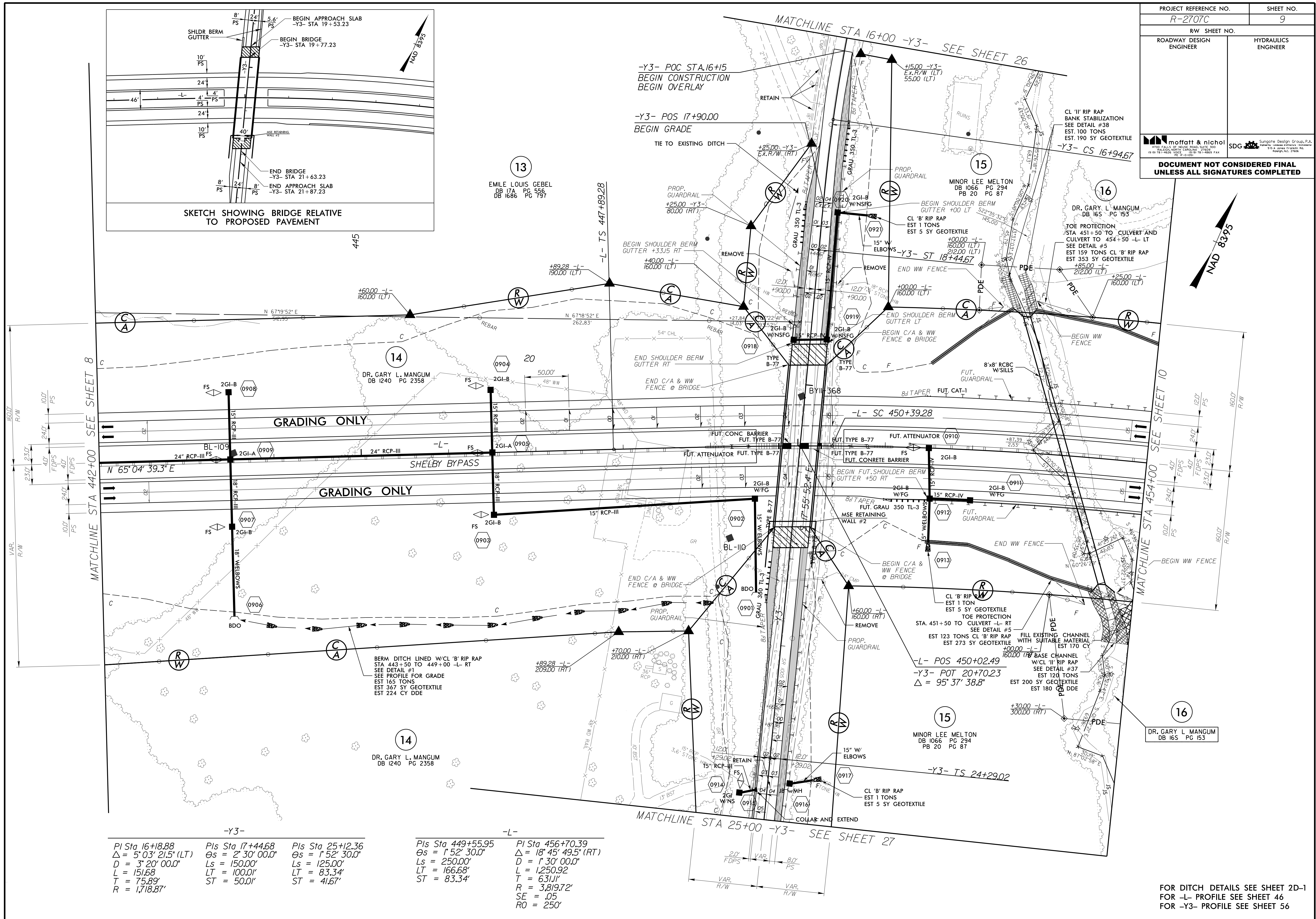


FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 45

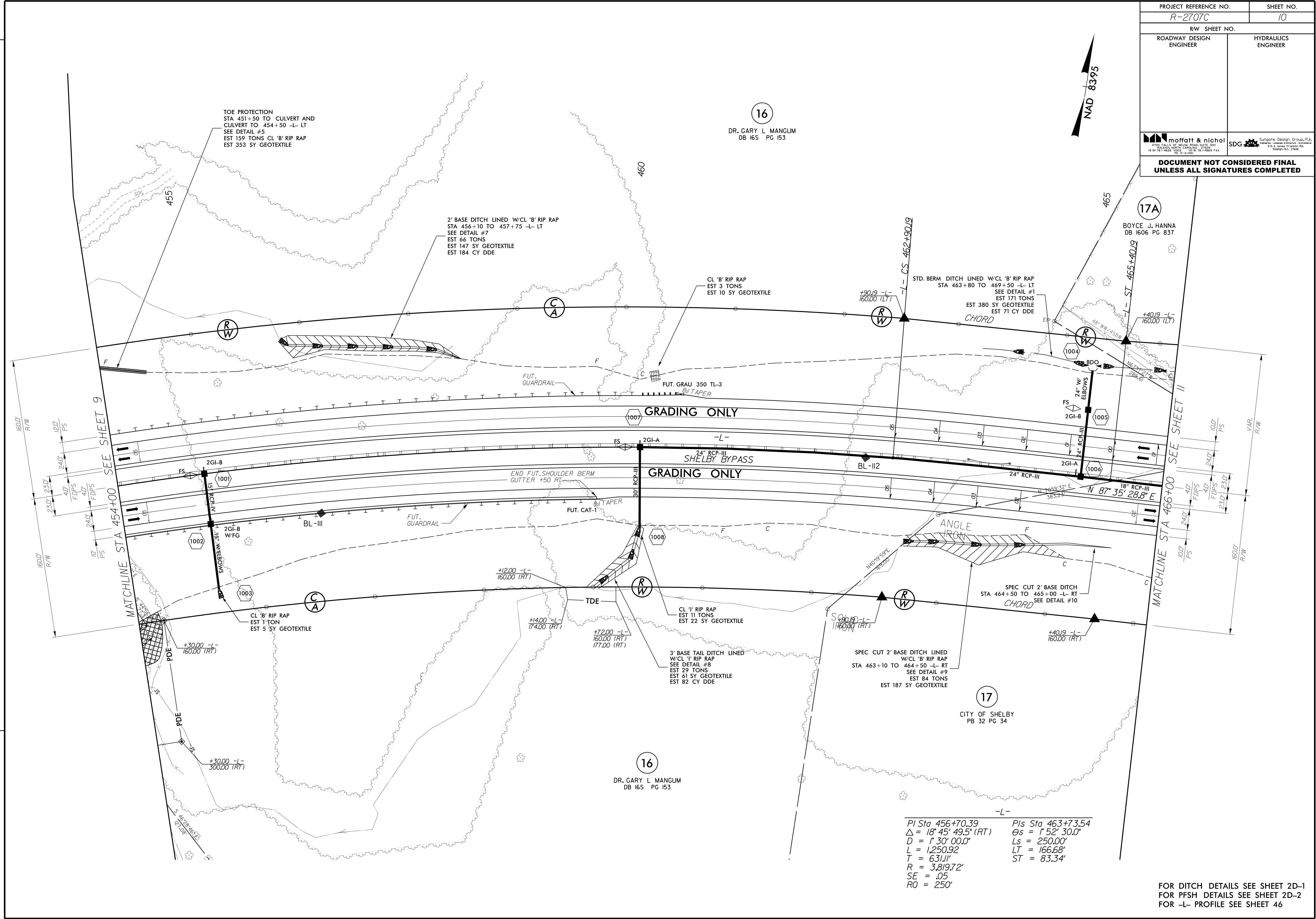
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		8
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
moftatt & nichol 1700 FAIRVIEW DRIVE, SUITE 200 ROSELAND, N.C. 27068 919-781-7800 FAX 919-781-7809		SDG Sundberg Design Group, P.A. 10000 WILSON ROAD, SUITE 200 ROSELAND, N.C. 27068 919-781-7800 FAX 919-781-7809
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 45



PROJECT REFERENCE NO.		SHEET NO.
R-2707C		10
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1700 FAULKNER BLVD., SUITE 200 RALEIGH, NORTH CAROLINA 27603 919-781-4624 VOICE 919-781-4624 FAX FAX 19-105051		 SDG Surgeon Design Group, P.A. 1000 FAULKNER BLVD., SUITE 200 RALEIGH, NC 27603 919-781-4624 VOICE 919-781-4624 FAX
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 17A - CHANGED PROPERTY OWNER NAMES AND DEED INFORMATION.

PI Sta 456+70.39
 $\Delta = 18^\circ 45' 49.5" (RT)$
 $D = 1' 30' 00.0"$
 $L = 1,250.92$
 $T = 631.11'$
 $R = 3,819.72'$
 $SE = .05$
 $RO = 250'$

PIs Sta 463+73.54
 $\Theta_s = 1' 52' 30.0"$
 $L_s = 250.00'$
 $LT = 166.68'$
 $ST = 83.34'$

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 46



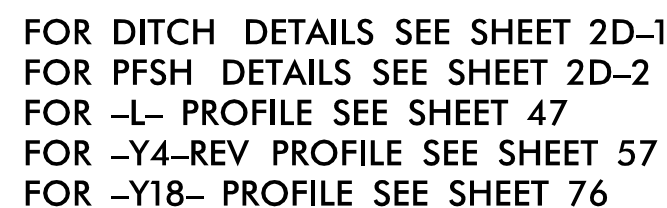
-Y4- DECK DRAIN RECOMMENDATIONS

RIGHT SIDE OF BRIDGE
USE STD. 6" DECK DRAINS ON 6' CENTER

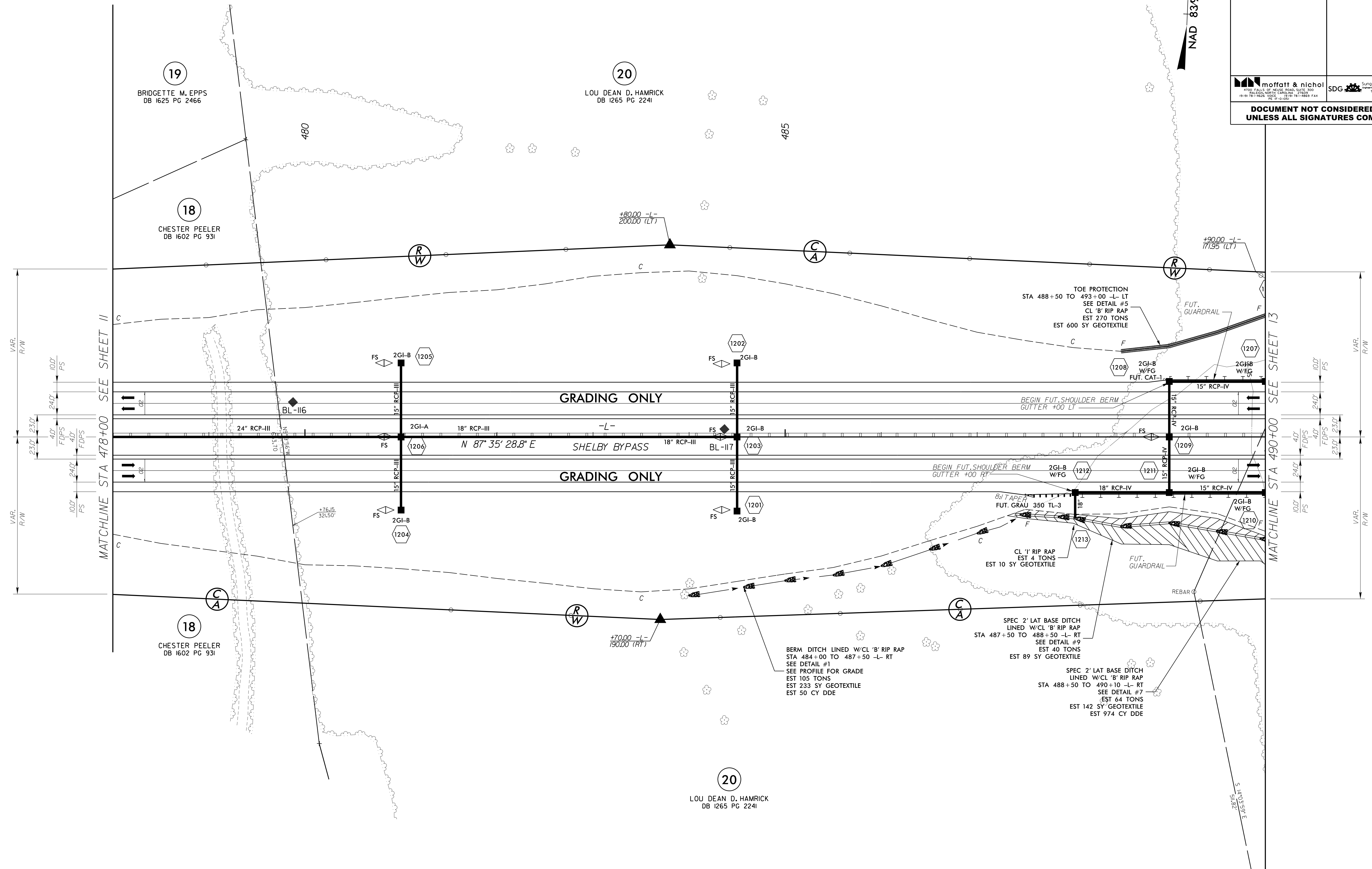
STA. 22 + 77 TO STA. 23 + 19 -Y4- RT
STA. 23 + 71 TO STA. 23 + 83 -Y4- RT
STA. 24 + 06 TO STA. 24 + 18 -Y4- RT
STA. 24 + 72 TO STA. 25 + 26 -Y4- RT

$$\frac{-L - POT \ 474 + 45.79}{-Y4 - REV \ POT \ 24 + 05.50}$$

PROJECT REFERENCE NO. <i>R-2707C</i>		SHEET NO. <i>II</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 500 RALEIGH, NORTH CAROLINA 27609 (919) 761-4626 VOIC (919) 761-4669 FAX FAX (919) 761-4626		SDG  Sanguate Design Group, Inc. 915-A Jones Franklin Road Raleigh, NC 27609	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

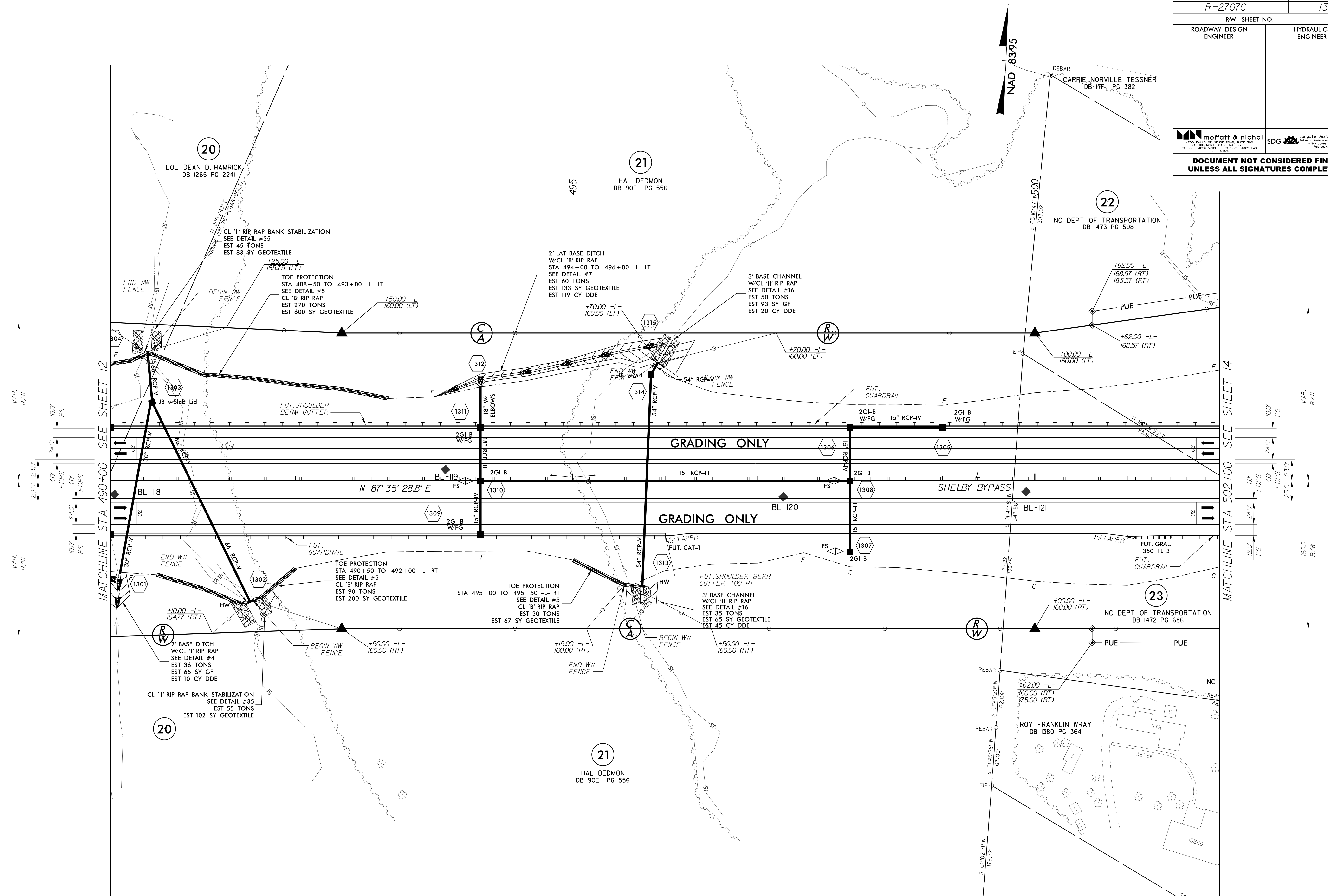


PROJECT REFERENCE NO.		SHEET NO.
R-2707C		12
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1700 FAULKNER DRIVE, SUITE 200 RALEIGH, NC 27609 919-781-4600 VOICE 919-781-4601 FAX		 SDG Sundt Design Group, P.A. 1914 JONES FERRY ROAD, SUITE 200 RALEIGH, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



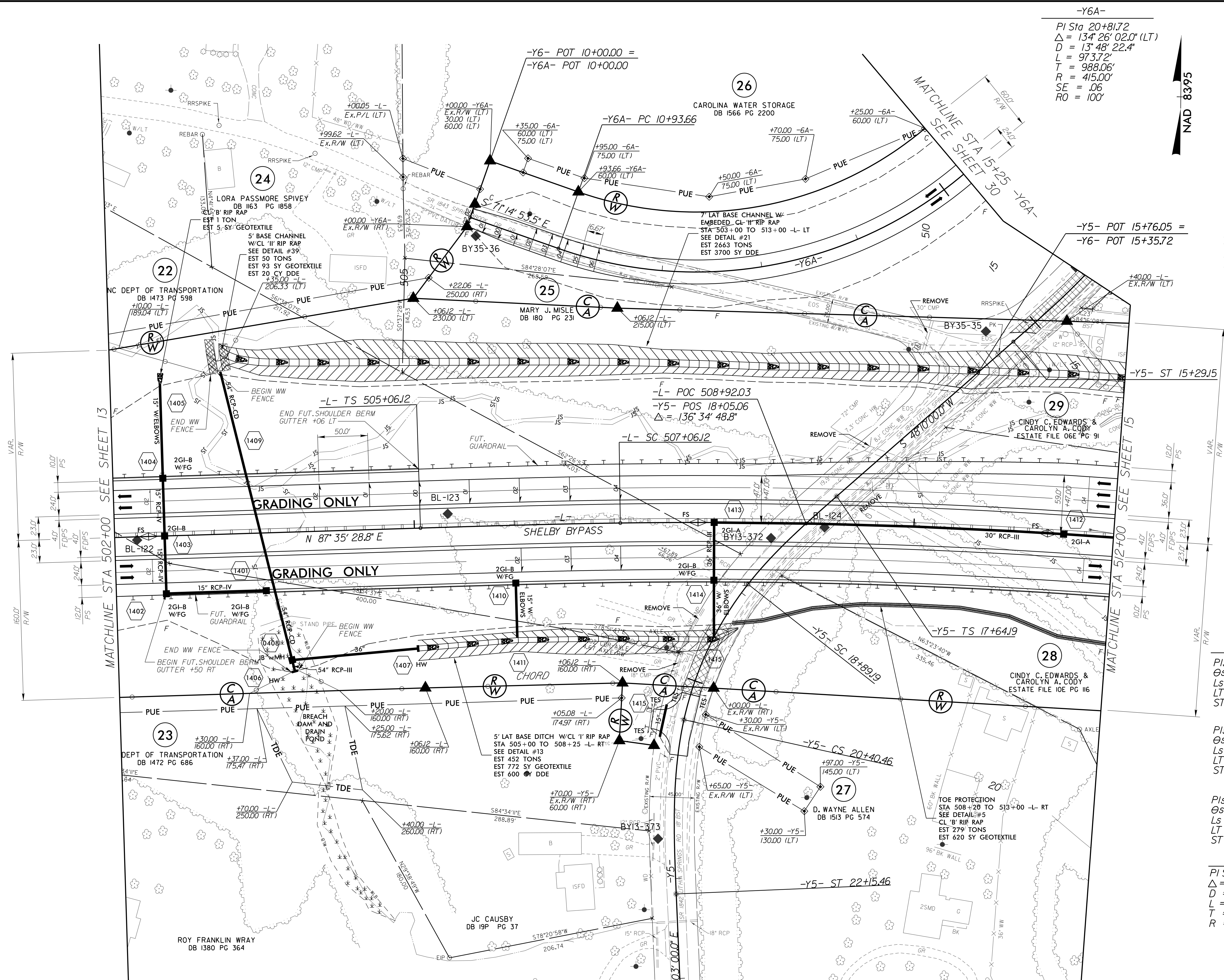
FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 47

PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		13	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEES ROAD, SUITE 300 BELLINGHAM, WASH. 98226 (360) 738-0800 FAX (360) 738-0808 P.E. (C-1055)		 SDG Sengstacke Design Group, P.A. 916 S. JONES FREIGHT RD. BELLINGHAM, WA 98226	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 48

REVISIONS
R/W REVISION 10-05-15 (ESI) - PARCEL 24 - CHANGED PROPERTY OWNER INFORMATION



-Y6A-
PI Sta 20+81.72
 $\Delta = 134^{\circ} 26' 02.0''$ (LT)
 $D = 13^{\circ} 48' 22.4''$
 $L = 973.72'$
 $R = 988.06'$
 $SE = .06$
 $RO = 100'$

NAD 83 95

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		14
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1700 FAULKNER DRIVE, SUITE 200 RALEIGH, NORTH CAROLINA 27609 919-781-4624 VOICE 919-781-4889 FAX 919-781-0051		 SDG Sundt Design Group, P.A. 1104 JONES STREET, SUITE 200 RALEIGH, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

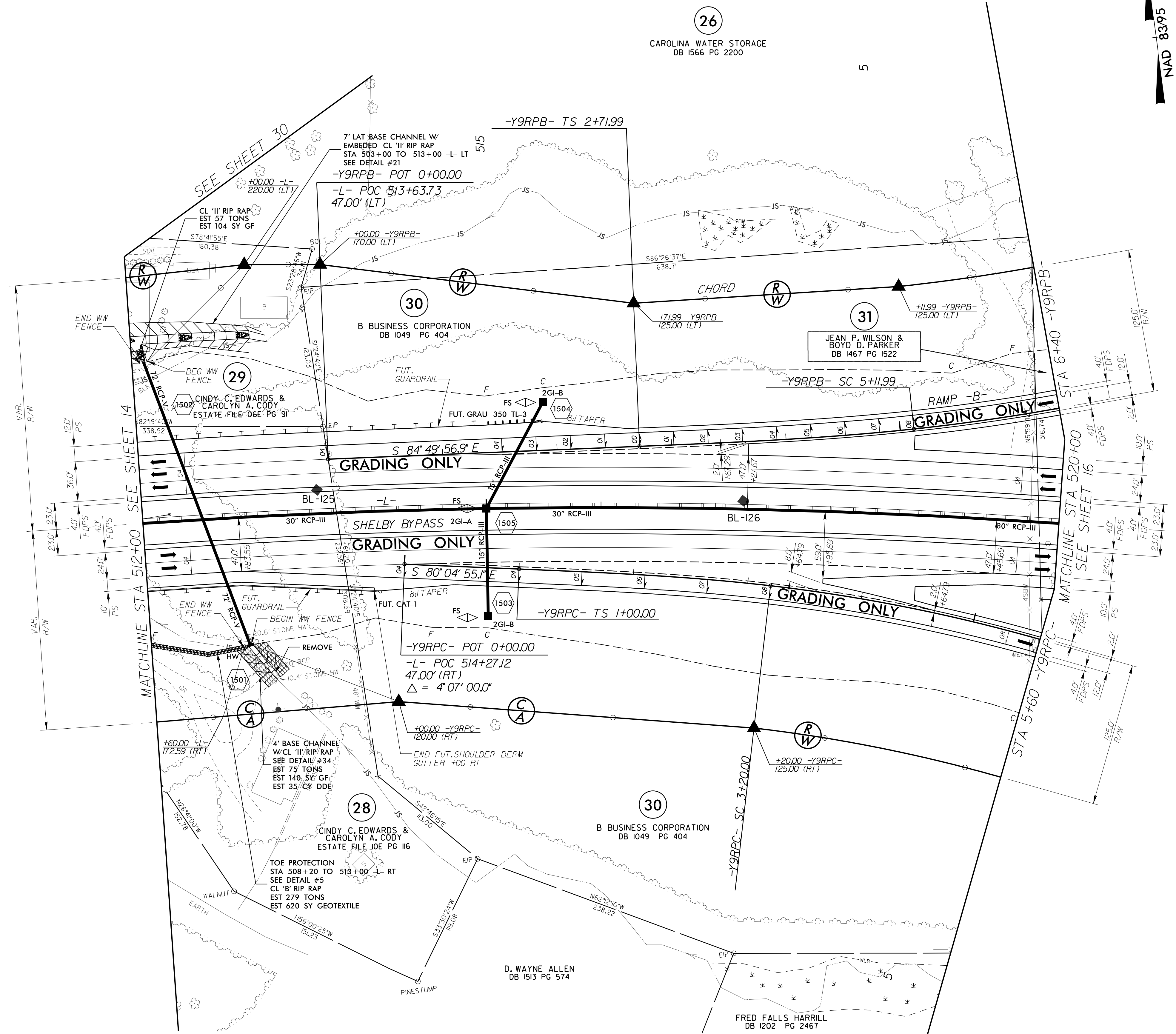
-L-
Pls Sta 506+39.45
 $\Delta s = 1^{\circ} 00' 00.0''$
 $Ls = 200.00'$
 $LT = 133.34'$
 $ST = 66.67'$
PI Sta 520+51.16
 $\Delta = 26^{\circ} 25' 21.1''$ (RT)
 $D = 1^{\circ} 00' 00.0''$
 $L = 2,642.25'$
 $T = 1,345.05'$
 $R = 5,729.58'$
 $SE = .04$
 $RO = 200'$

-Y5-
Pls Sta 13+96.72
 $\Delta s = 21^{\circ} 30' 00.0''$
 $Ls = 200.00'$
 $LT = 134.33'$
 $ST = 67.57'$
PI Sta 14+85.71
 $\Delta = 30^{\circ} 39' 00.8''$ (RT)
 $D = 38^{\circ} 11' 49.9''$
 $L = 80.24'$
 $T = 41.11'$
 $R = 150.00'$
Pls Sta 18+47.67
 $\Delta s = 10^{\circ} 37' 30.0''$
 $Ls = 125.00'$
 $LT = 83.48'$
 $ST = 41.80'$
PI Sta 19+66.12
 $\Delta = 25^{\circ} 43' 00.0''$ (LT)
 $D = 17^{\circ} 00' 00.0''$
 $L = 151.27'$
 $T = 76.93'$
 $R = 337.03'$

-Y6-
Pls Sta 11+13.95
 $\Delta = 6^{\circ} 23' 59.7''$ (LT)
 $D = 5^{\circ} 43' 46.5''$
 $L = 111.70'$
 $R = 1,000.00'$
PI Sta 14+85.71
 $\Delta = 30^{\circ} 39' 00.8''$ (RT)
 $D = 38^{\circ} 11' 49.9''$
 $L = 80.24'$
 $T = 41.11'$
 $R = 150.00'$

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 48
FOR -Y6A- PROFILE SEE SHEET 58

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		15
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1500 FALLS OF THE ROYAL ROAD, SUITE 200 RALEIGH, NORTH CAROLINA 27609 919.781.4624 VOICE 919.781.4625 FAX 919.781.4625		 SDG Sundberg Design Group, P.A. 10000 W. LANTANA AVENUE, SUITE 200 FORT LAUDERDALE, FLORIDA 33304 954.477.1100 VOICE 954.477.1101 FAX 954.477.1102
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

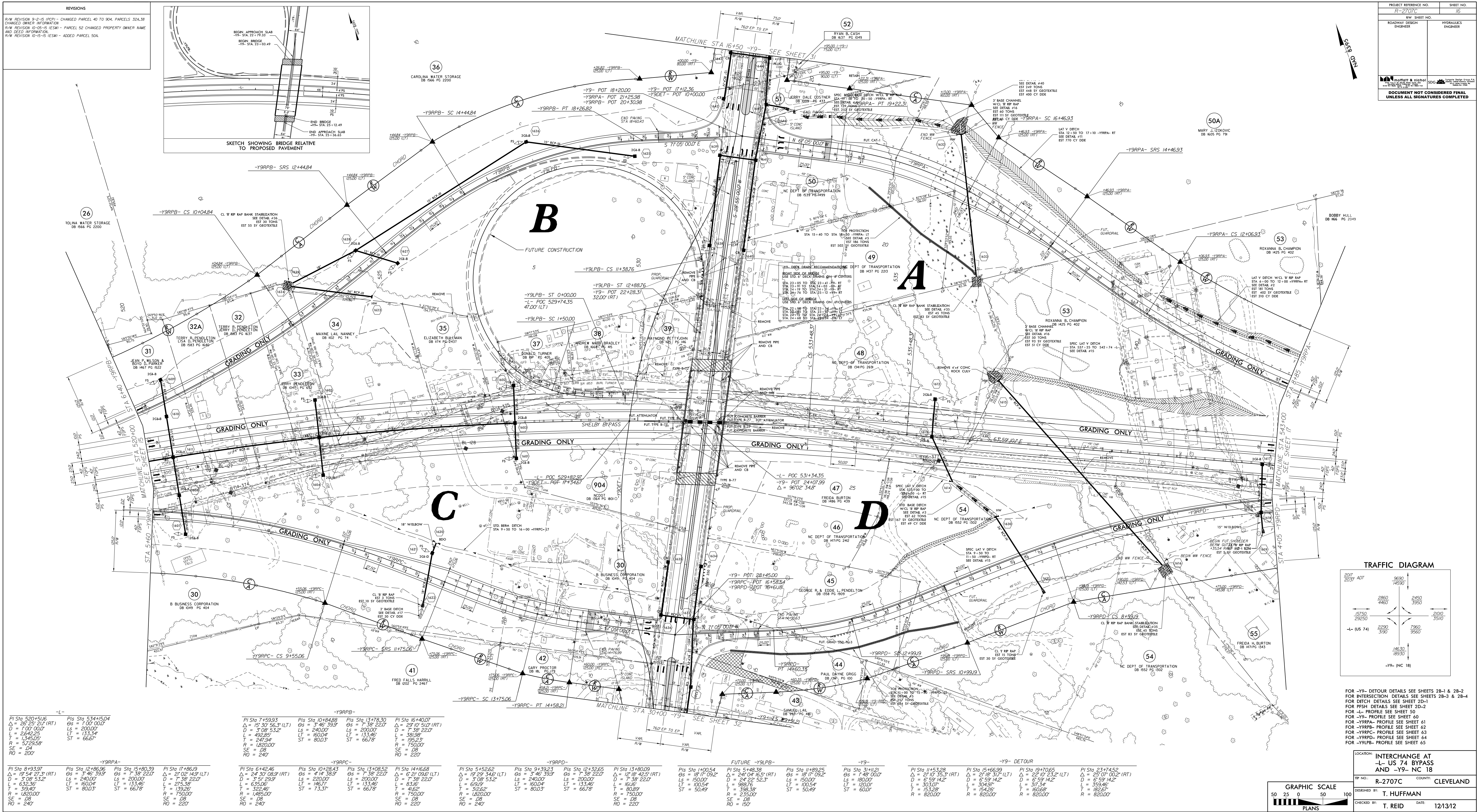


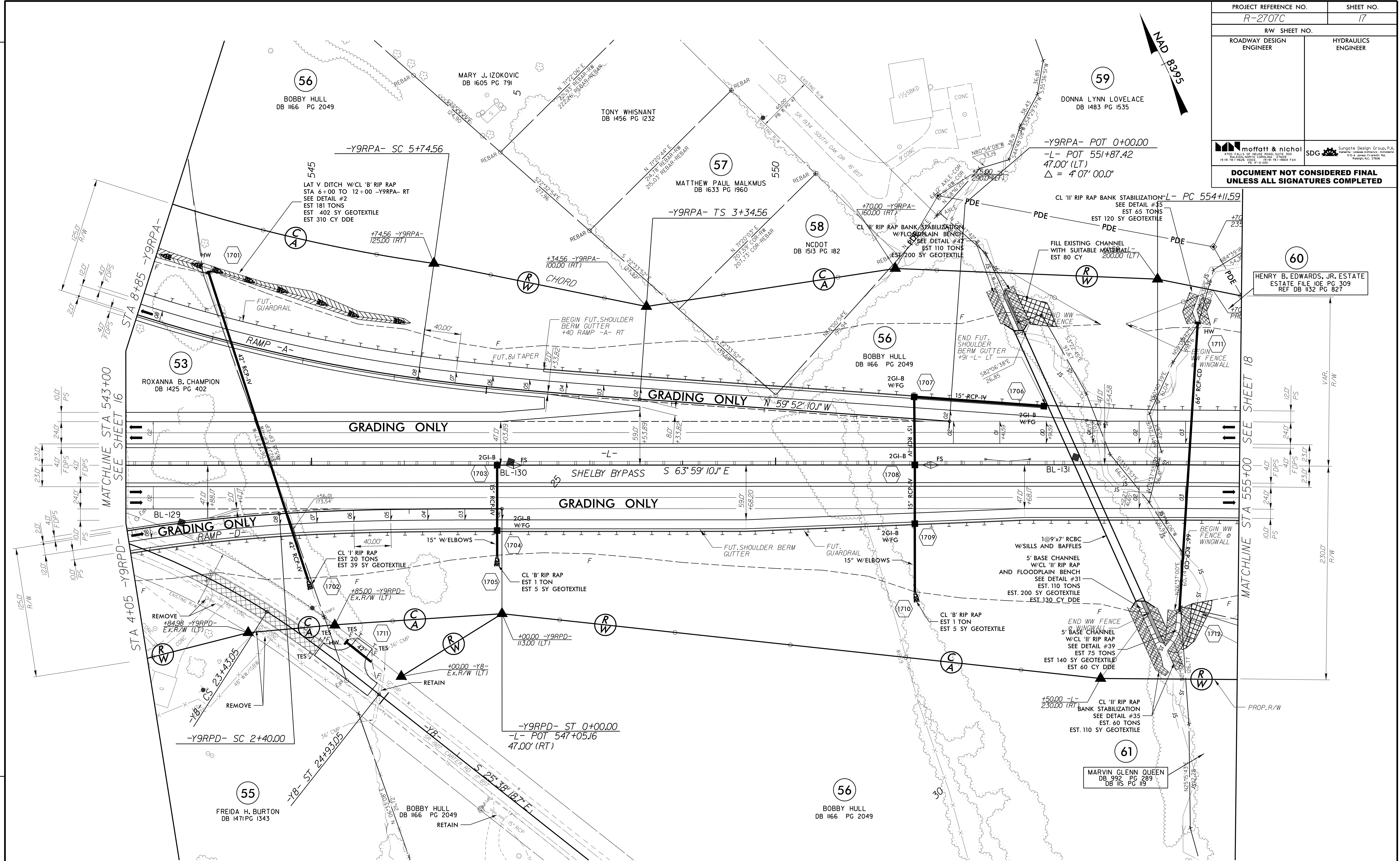
-L-
PI Sta 520+51.16
 $\Delta = 26' 25' 21.1''$ (RT)
 $D = 1' 00' 00.0''$
 $L = 2,642.25'$
 $T = 1,345.05'$
 $R = 5,729.58'$
 $SE = .04$
 $RO = 200'$

-Y9RPB-
PIs Sta 4+32.03 PI Sta 7+59.93
 $\Theta s = 3' 46' 39.9''$ $\Delta = 15' 30' 56.3''$ (LT)
 $Ls = 240.00'$ $D = 3' 08' 53.2''$
 $LT = 160.04'$ $L = 492.85'$
 $ST = 80.03'$ $T = 247.94'$
 $R = 1,820.00'$
 $SE = .08$
 $RO = 220'$

-Y9RPC-
PIs Sta 2+46.71 PI Sta 6+42.46
 $\Theta s = 4' 14' 38.9''$ $\Delta = 24' 30' 08.9''$ (RT)
 $Ls = 220.00'$ $D = 3' 51' 29.9''$
 $LT = 146.71'$ $L = 635.06'$
 $ST = 73.37'$ $T = 322.46'$
 $R = 1,485.00'$
 $SE = .08$
 $RO = 220'$

FOR DITCH DETAILS SEE SHEET 2D-1
FOR -L- PROFILE SEE SHEET 49
FOR -Y9RPB- PROFILE SEE SHEET 62
FOR -Y9RPC- PROFILE SEE SHEET 63

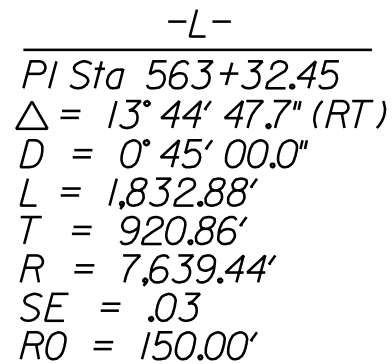




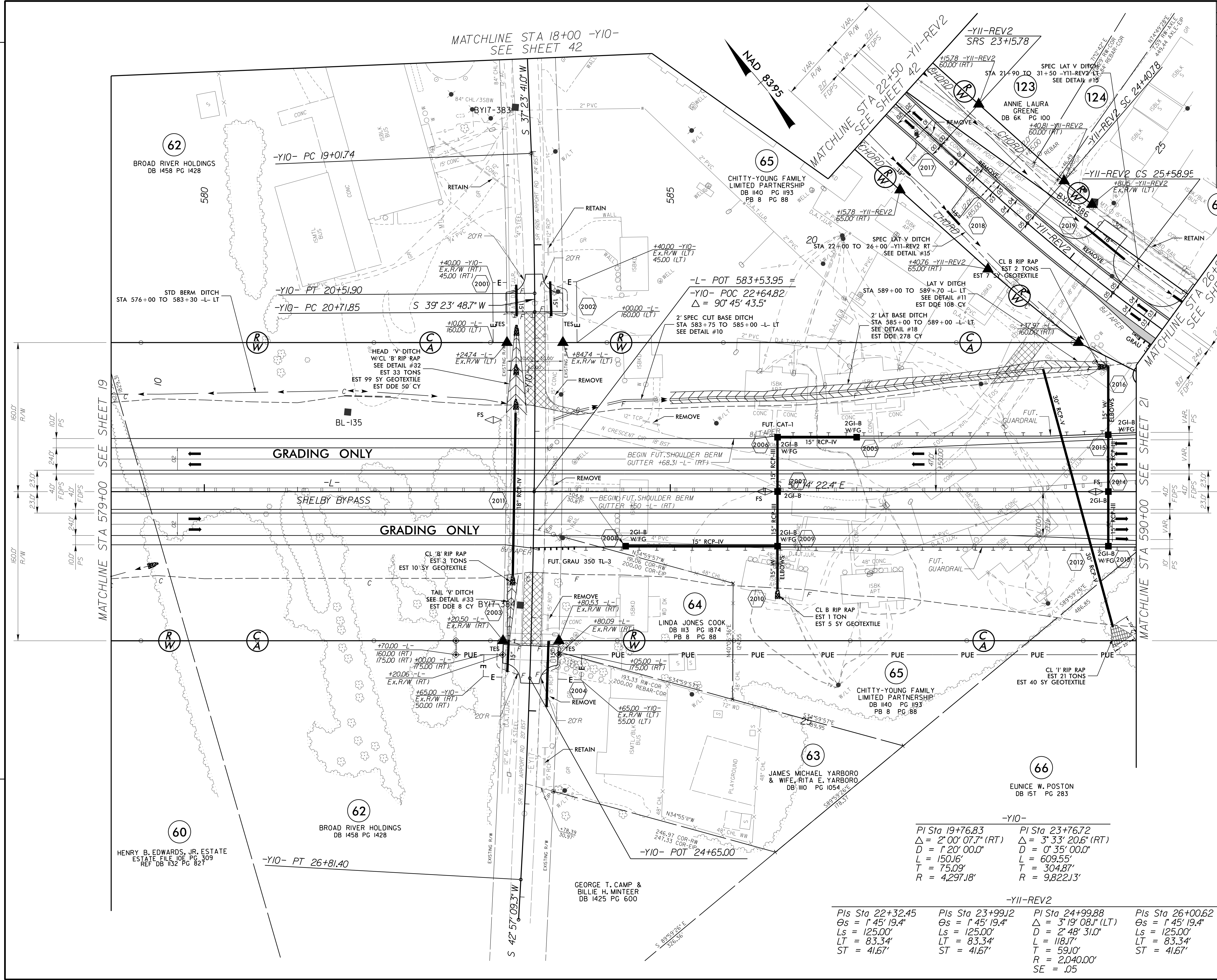
-L-	-Y9RPA-	-Y9RPD-	-Y8-
PI Sta 563+32.45 $\Delta = 13^\circ 44' 47.7''$ (RT) $D = 0' 45'' 00.0''$ $L = 1,832.88'$ $T = 920.86'$ $R = 7,639.44'$ $SE = .03$ $RO = 150.00'$	PIs Sta 4+94.60 $\Delta s = 3' 46' 39.9''$ $D = 240.00'$ $LT = 160.04'$ $ST = 80.03'$	PI Sta 8+93.97 $\Delta = 19' 54' 27.3''$ (RT) $D = 3' 08' 53.2''$ $L = 632.36'$ $T = 319.40'$ $R = 1,820.00'$ $SE = .08$ $RO = 240'$	PIs Sta 1+60.04 $\Delta s = 3' 46' 39.9''$ $D = 240.00'$ $LT = 160.04'$ $ST = 80.03'$
		PI Sta 5+52.62 $\Delta = 19' 29' 34.6''$ (LT) $D = 3' 08' 53.2''$ $L = 619.19'$ $T = 312.62'$ $R = 1,820.00'$ $SE = .08$ $RO = 240'$	
			PI Sta 21+71.57 $\Delta = 26' 47' 34.0''$ (RT) $D = 7' 40' 00.0''$ $L = 349.47'$ $T = 177.99'$ $R = 747.34'$
			PIs Sta 23+93.09 $\Delta s = 5' 45' 00.0''$ $D = 150.00'$ $LT = 100.05'$ $ST = 50.05'$

FOR DITCH DETAILS SEE SHEET 2D-1
FOR PFSH DETAILS SEE SHEET 2D-2
FOR -L- PROFILE SEE SHEET 51
FOR -Y9RPA- PROFILE SEE SHEET 61
FOR -Y9RPD- PROFILE SEE SHEET 64

62

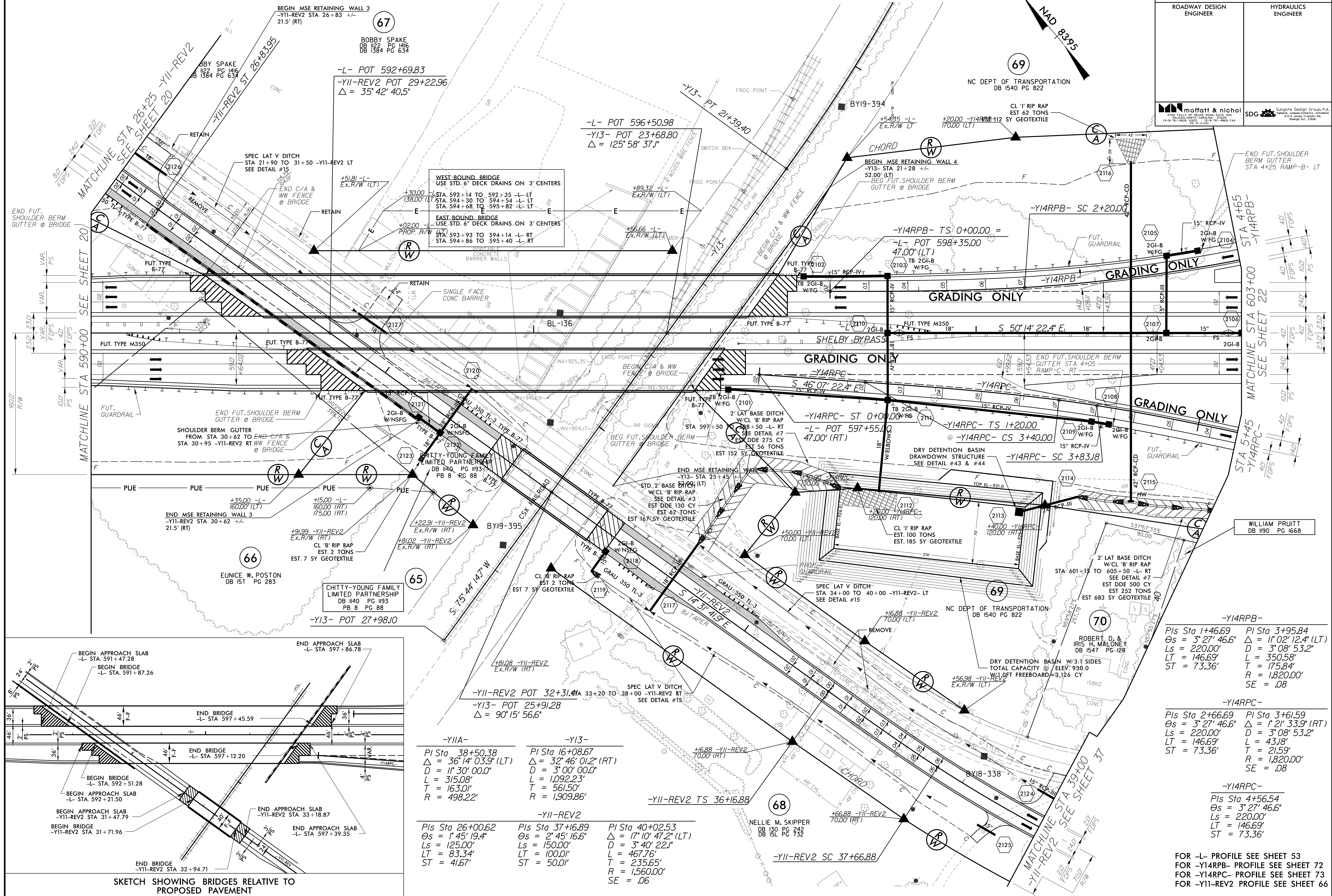


R/W REVISION 9-2-15 (PCP) - PARCEL 62 - MOVED PARCEL NUMBER MARKER TO CURRENT LOCATION.



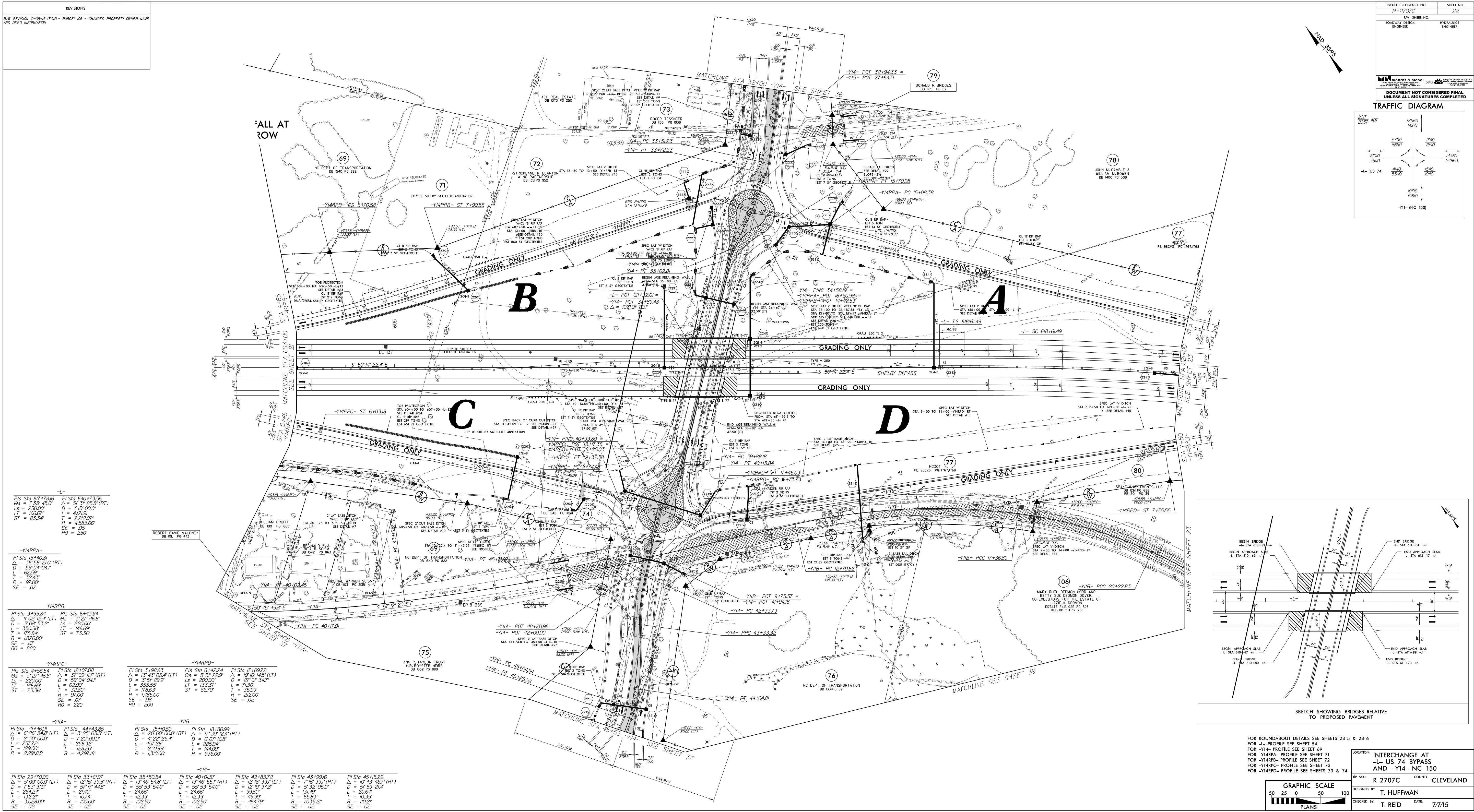
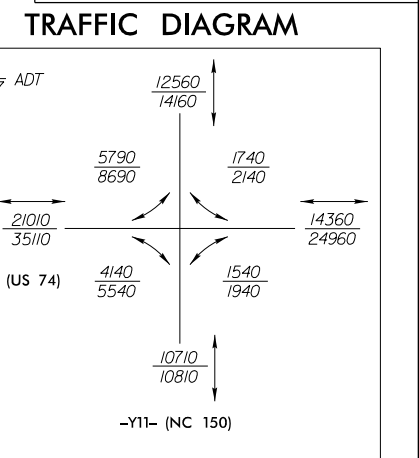
-Y10-		-Y11-REV2	
PI Sta 19+76.83	PI Sta 23+76.72	PI Sta 24+99.88	PI Sta 26+00.62
$\Delta = 2^{\circ} 00' 07.7''$ (RT)	$\Delta = 3^{\circ} 33' 20.6''$ (RT)	$\Delta = 3^{\circ} 19' 08.1''$ (LT)	$\Delta = 1^{\circ} 45' 19.4''$
$D = 1^{\circ} 20' 00.0''$	$D = 0^{\circ} 35' 00.0''$	$D = 2^{\circ} 48' 31.0''$	$D = 125.00'$
$L = 150.16'$	$L = 609.55'$	$L = 118.17'$	$L = 83.34'$
$T = 75.09'$	$T = 304.87'$	$T = 59.10'$	$T = 41.67'$
$R = 4,297.18'$	$R = 9,822.13'$	$R = 2,040.00'$	$R = .05$
SE = .05			

FOR -L- PROFILE SEE SHEET 52
FOR -Y11-REV2 PROFILE SEE SHEET 66



REVISIONS
R/W REVISION 0-05-15 (ESM) - PARCEL 06 - CHARGED PROPERTY OWNER NAME AND DEED INFORMATION

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	22
R/W SHEET NO.	ROADWAY DESIGN
ENGINEER	HYDRAULICS ENGINEER
modoff & nichols	modoff & nichols
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-
 PIS STA 617+78.16
 Δ = 1' 33" 45.0"
 L = 250.00'
 LT = 166.67'
 ST = 83.34'
 R = 250.00'
 SE = 0.00'
 RD = 250

-Y14RPA-
 PIS STA 15+40.81
 Δ = 36' 58" 21.0" (RT)
 L = 59' 04" 04.1"
 L = 62.59'
 L = 32.43'
 R = 97.00'
 SE = 0.00'
 RD = 220

-Y14RPB-
 PIS STA 3+95.84
 Δ = 1' 02" 15.4" (LT)
 L = 3' 08" 53.2"
 L = 230.00'
 T = 175.84'
 SE = 0.00'
 RD = 220

-Y14RPC-
 PIS STA 4+56.54
 Δ = 3' 07" 46.8"
 L = 230.00'
 L = 146.69'
 ST = 73.36'
 R = 230.00'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 4+46.01
 Δ = 6' 26" 34.8" (LT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

-Y14R-
 PIS STA 15+10.60
 Δ = 20' 00" 00.0" (RT)
 L = 2' 30" 00.0" (RT)
 L = 257.72'
 T = 129.01'
 R = 229.83'
 SE = 0.00'
 RD = 220

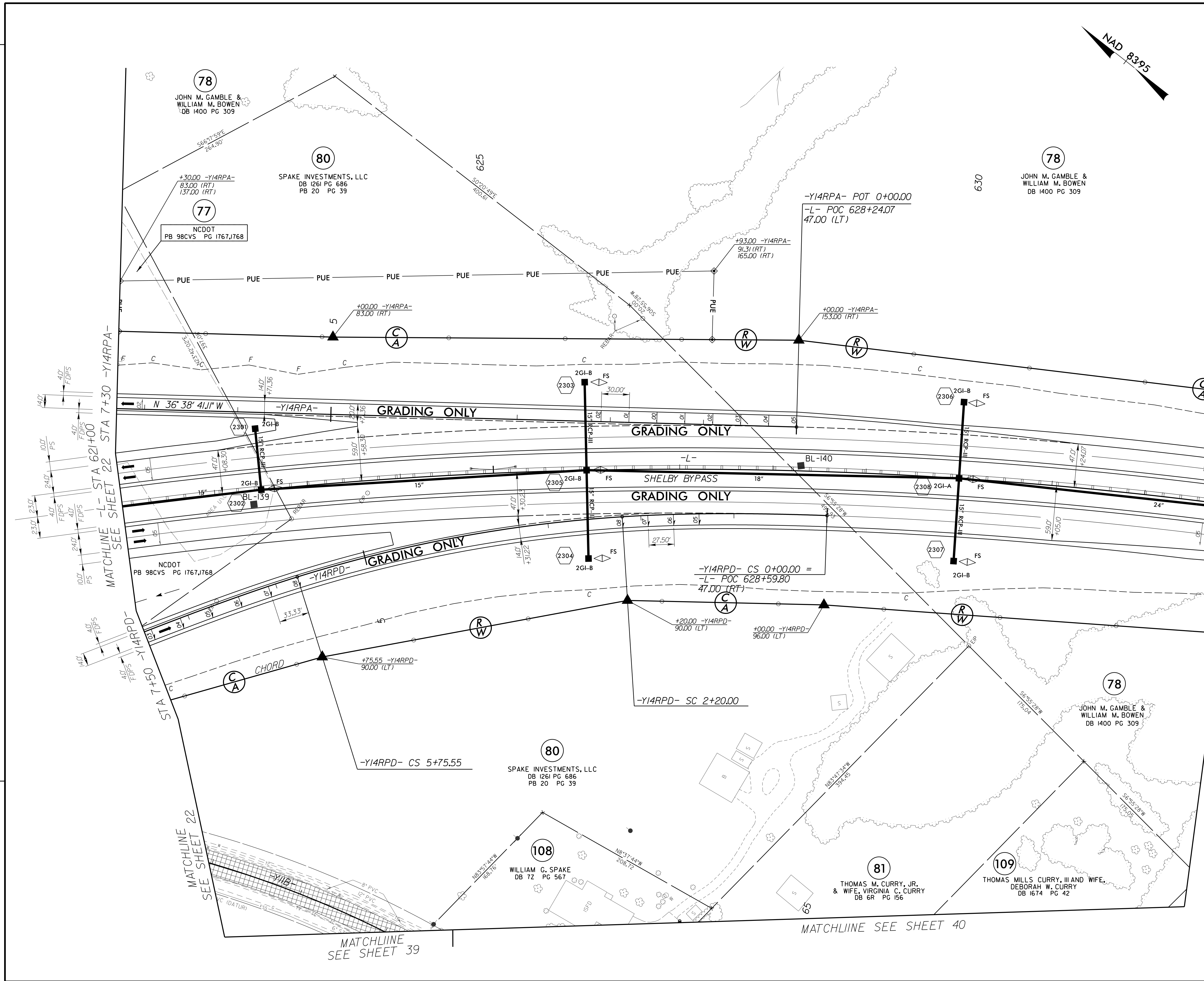
FOR ROUNDABOUT DETAILS SEE SHEETS 28-5 & 28-6
 FOR -L- PROFILE SEE SHEET 54
 FOR -Y14- PROFILE SEE SHEET 69
 FOR -Y14RPA- PROFILE SEE SHEET 71
 FOR -Y14RPB- PROFILE SEE SHEET 72
 FOR -Y14RPC- PROFILE SEE SHEET 73
 FOR -Y14R- PROFILE SEE SHEETS 73 & 74

LOCATION: INTERCHANGE AT
 -L- US 74 BYPASS
 AND -Y14- NC 150

RFP NO.: R-2707C COUNTY: CLEVELAND
 DESIGNED BY: T. HUFFMAN
 CHECKED BY: T. REID DATE: 7/7/15

GRAPHIC SCALE
 50 25 0 50 100
 PLANS

REVISIONS
R/W REVISION - 10-05-15 (ESM) - PARCEL 81 - CHANGED PROPERTY OWNER NAME INFORMATION / PARCELS 108 & 109 - ADDED PARCELS



PROJECT REFERENCE NO.		SHEET NO.
R-2707C		23
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
moffatt & nichol 1700 FAIRVIEW DRIVE, SUITE 200 RICHMOND, VA 23261 TEL: 781-462-1000 FAX: 781-462-1001		SDG Sungate Design Group, P.A. 10000 W. WILSON ROAD, SUITE 100 RICHMOND, VA 23234 TEL: 781-462-1000 FAX: 781-462-1001
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

-L-
PI Sta 640+73.56
Δ = 5' 31' 25.8" (RT)
D = 1' 15' 00.0"
L = 4,121.91
T = 2,212.07'
R = 4,583.66'
SE = .05

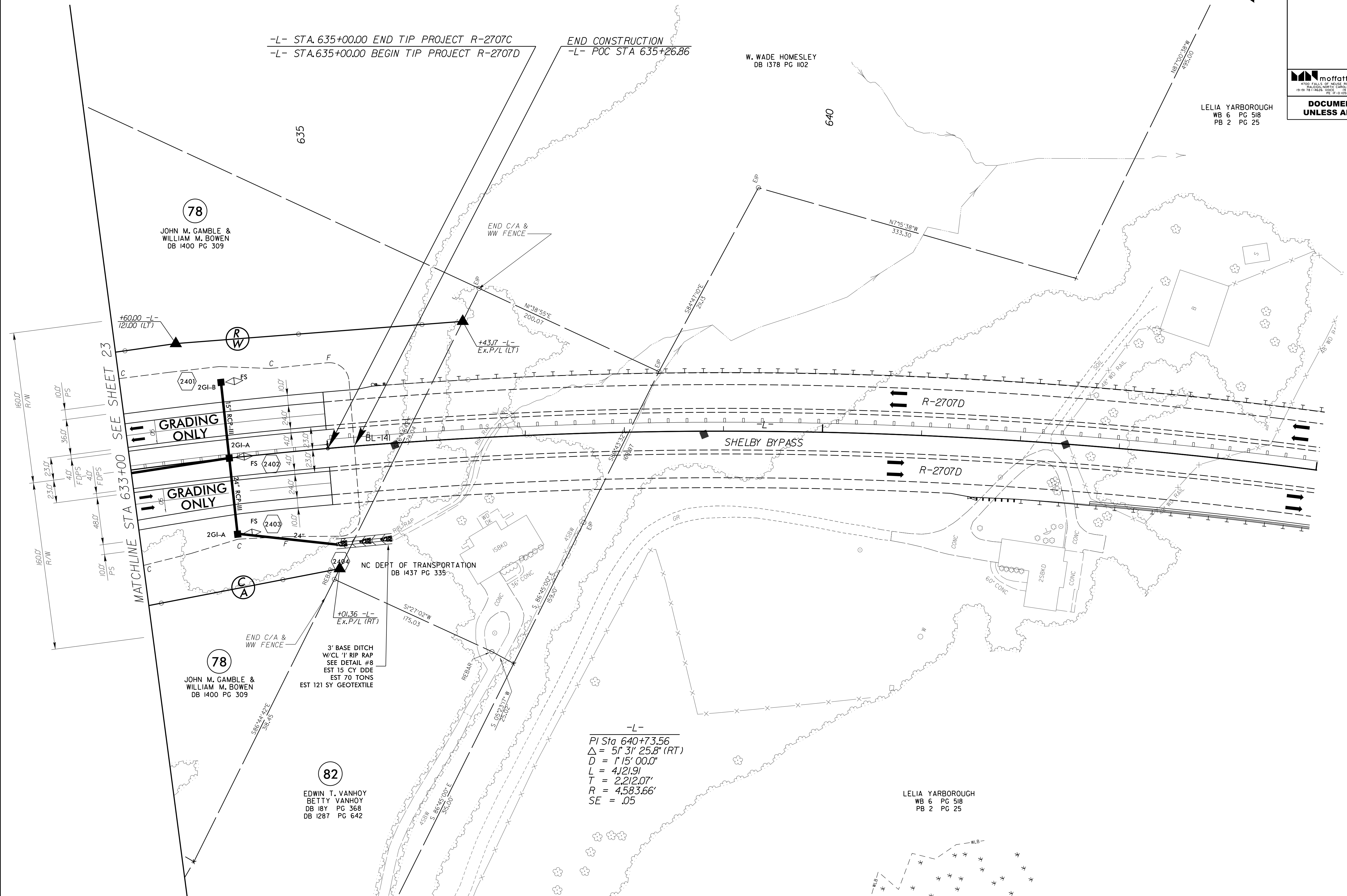
-Y14RPA-
PI Sta 1+28.67
Δs = 1' 15' 46.6"
Δs = 3' 51' 29.9"
Ls = 220.00'
LT = 128.67'
ST = 91.50'
PI Sta 3+98.63
Δ = 13' 43' 05.4" (LT)
D = 3' 51' 29.9"
L = 355.55'
T = 178.63'
R = 1,485.00'
SE = .08
RO = 200'

-Y14RPD-
PI Sta 6+42.24
Δs = 3' 51' 29.9"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-Y11B-
PI Sta 22+25.61
Δ = 20' 00' 00.0" (RT)
D = 4' 58' 56.1"
L = 401.43'
T = 202.78'
R = 1,150.00'

FOR -L- PROFILE SEE SHEET 55
FOR -Y14RPA- PROFILE SEE SHEET 71
FOR -Y14RPD- PROFILE SEE SHEET 73

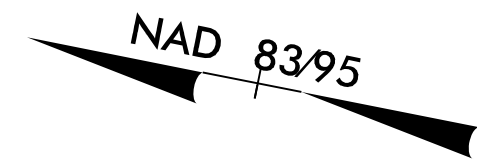
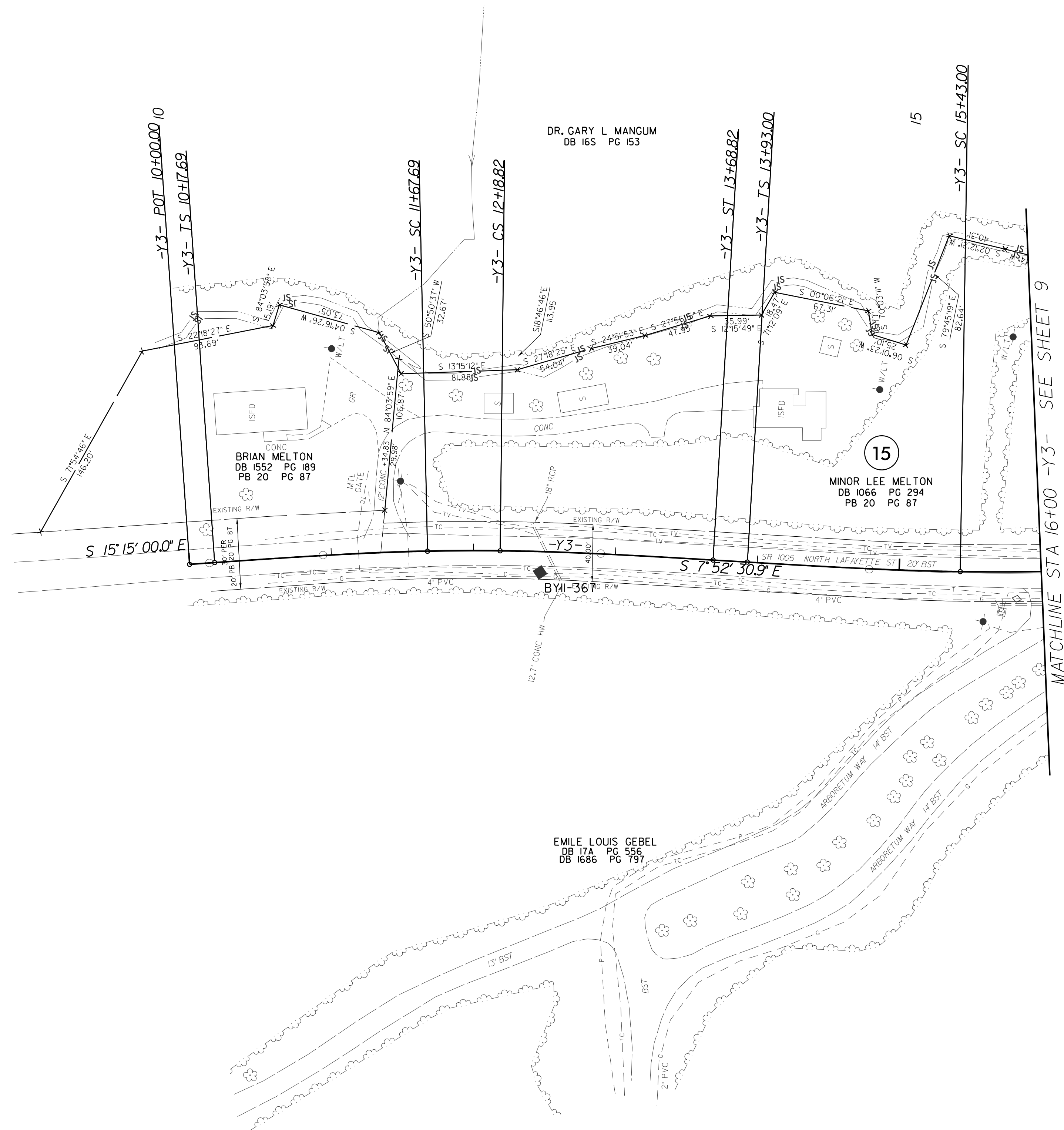
PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		24	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEED ROAD, SUITE 300 FORT COLLINS, CO 80501-1767 970.226.0000 FAX 970.226.0004 P.E. (E-0005)		SDG  Sengstacke Design Group, P.A. (sewing, casual business) 10000 914 JONES FARM RD. MORGAN, AL 36050	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 82 AND 83 - COMBINED PARCEL 83 INTO PARCEL 82.

FOR -L- PROFILE SEE SHEET 55

REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 15 - ADDED OUT CONVEYANCE TO PARCEL

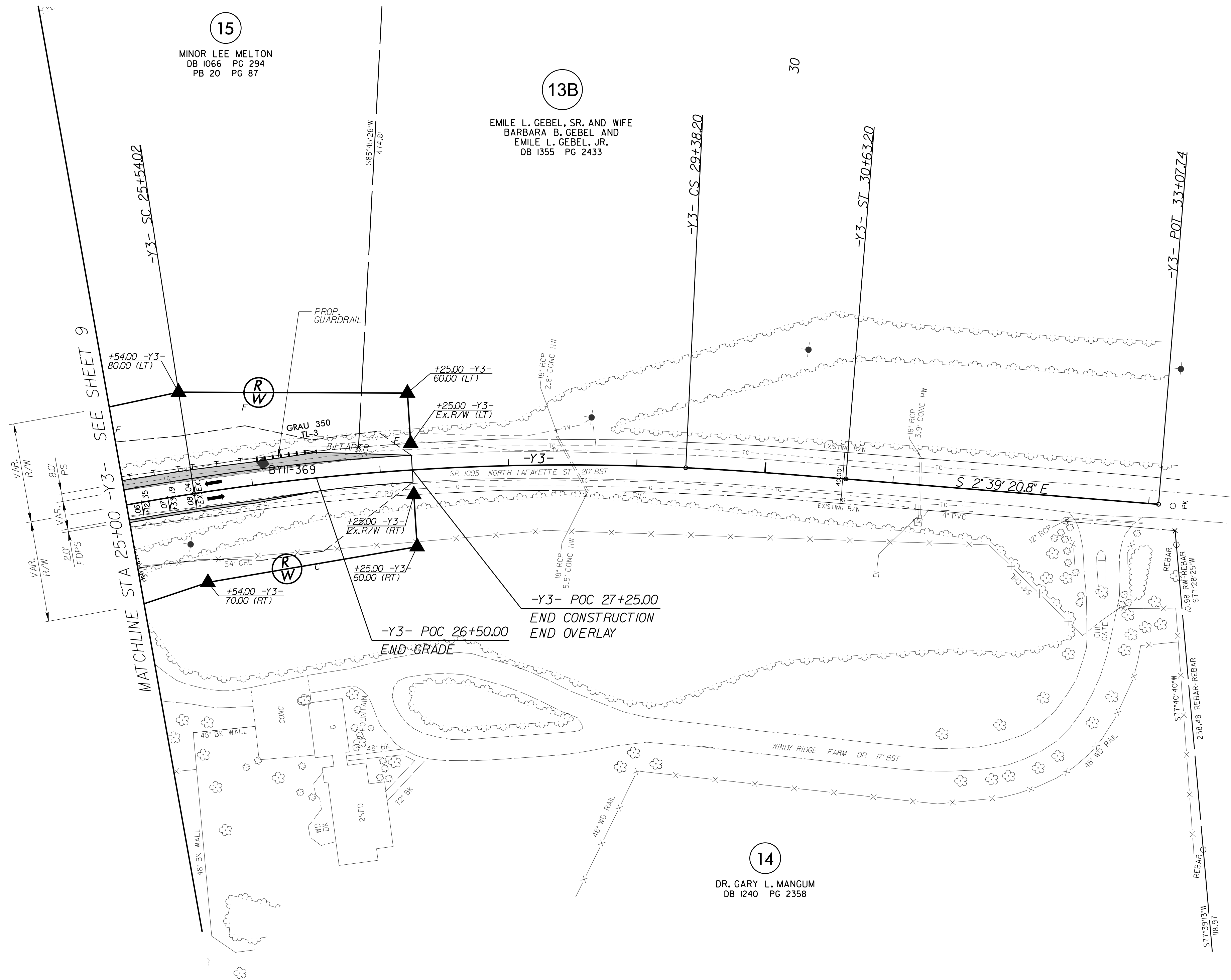
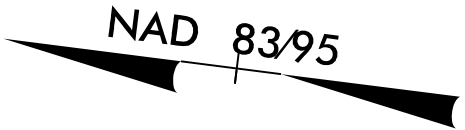


PROJECT REFERENCE NO.		SHEET NO.
R-2707C		26
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1400 FAULK, DR. WILMINGTON, NC 28403 919-781-4624 VOICE 919-781-4625 FAX 919-781-4626		 SDG Sundt Design Group, P.A. 1000 W. JONES ST. SUITE 200 RALEIGH, NC 27601 919-781-4624 VOICE 919-781-4625 FAX 919-781-4626
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

-Y3-		
Pls Sta 11+17.70 $\theta_s = 2^\circ 45' 00.0''$ $L_s = 150.00'$ $LT = 100.01'$ $ST = 50.01'$	Pl Sta 11+93.26 $\Delta = 1^\circ 52' 29.1'' (RT)$ $D = 3^\circ 40' 00.0''$ $L = 51.13$ $T = 25.57'$ $R = 1,562.61'$	Pls Sta 12+68.83 $\theta_s = 2^\circ 45' 00.0''$ $L_s = 150.00'$ $LT = 100.01'$ $ST = 50.01'$

Pls Sta 14+93.01 $\theta_s = 2^\circ 30' 00.0''$ $L_s = 150.00'$ $LT = 100.01'$ $ST = 50.01'$	Pl Sta 16+8.88 $\Delta = 5^\circ 03' 21.5'' (LT)$ $D = 3^\circ 20' 00.0''$ $L = 151.68$ $T = 75.89'$ $R = 1,718.87'$
---	---

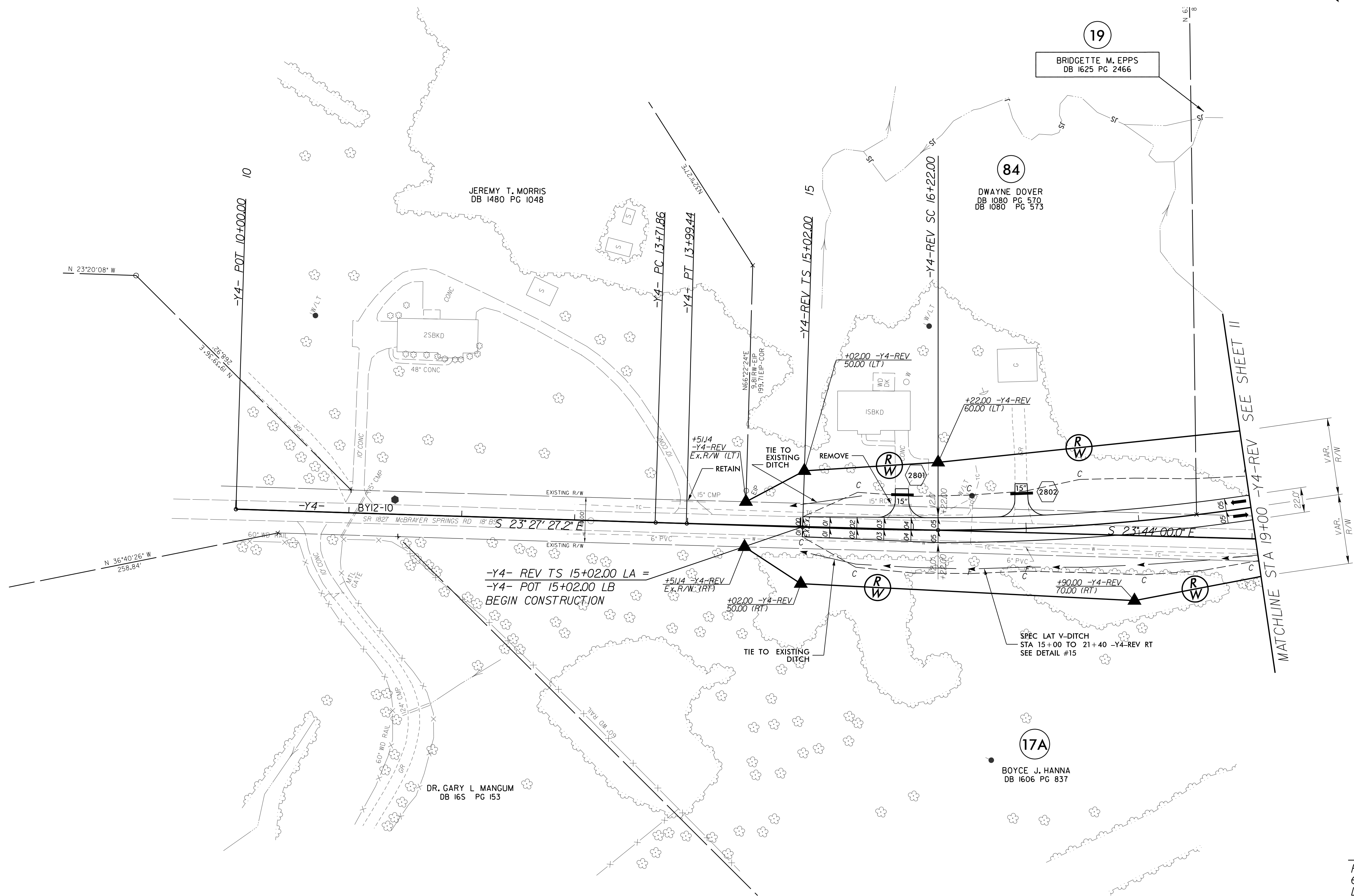
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		27
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1700 FAULK, DR. WILSON, NC 27603 919-781-4600 FAX 919-781-4609 1919 781-4600 VOICE 919-781-4609 FAX 919-781-4609		 SDG Sungate Design Group, P.A. 10000 W. JONES FERRY RD. Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



-Y3-		
Pls Sta 25+12.36 Δs = 1° 52' 30.0" Ls = 125.00' LT = 83.34' ST = 41.67'	Pl Sta 27+46.76 Δ = 11° 31' 31.6" (RT) D = 3° 00' 00.0" L = 384.18 T = 192.74' R = 1,909.86' SE = EXIST.	Pls Sta 29+79.88 Δs = 1° 52' 30.0" Ls = 125.00' LT = 83.34' ST = 41.67'

FOR -Y3- PROFILE SEE SHEET 56

REVISIONS
R/W REVISION 9-2-15 (PCP) - PARCEL 17A - CHANGED PROPERTY OWNER NAMES AND DEED INFORMATION.

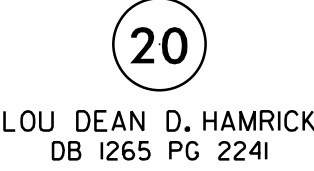


PROJECT REFERENCE NO. <i>R-2707C</i>		SHEET NO. <i>28</i>
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 1400 FAULK, DR. WILMINGTON, NC 28403 919-781-4600 FAX 919-781-4889 15191-781-4600 VOICEMAIL 15191-781-4600		 Sundata Design Group, P.A. 10000 W. JONES FERRY RD. RALEIGH, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

-Y4-
PI Sta 13+85.65
 $\Delta = 0^{\circ} 16' 32.7''$ (LT)
D = 1'00'00.0"
L = 27.58'
T = 13.79'
R = 5,729.58'

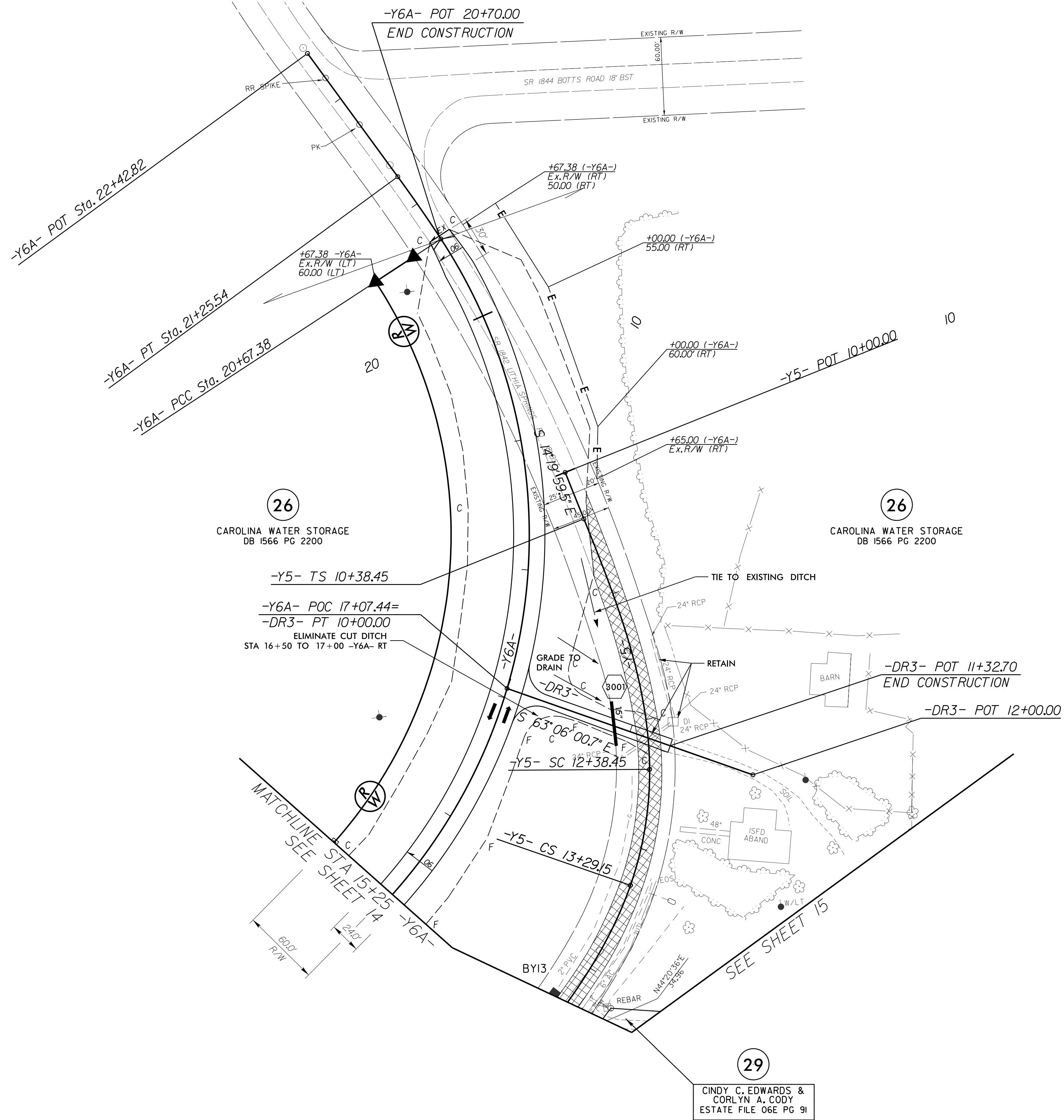
-Y4-REV
PIs Sta 15+82.00 PI Sta 18+44.49
 $\Delta s = 1^{\circ} 48' 00.0''$ $\Delta = 13^{\circ} 17' 22.9''$ (LT)
Ls = 120.00' D = 3'00'00.0"
LT = 80.00' L = 442.99'
ST = 40.00' T = 222.49'
R = 1,909.86'
SE = .05
RO = 120'

NAD 83/95



FOR DITCH DETAILS SEE SHEET 2D-1
FOR -Y4-REV PROFILE SEE SHEET 57
FOR -Y18- PROFILE SEE SHEET 76

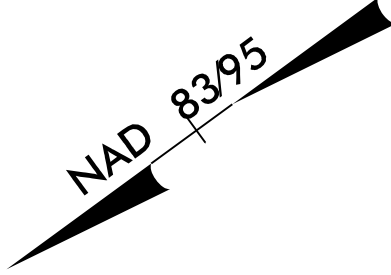
PROJECT REFERENCE NO.		SHEET NO.
R-2707C		30
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
 MOFFATT & NICHOL 1700 FAULKNER DRIVE, SUITE 200 RALEIGH, NORTH CAROLINA 27609 919-781-4624 VOICE 919-781-4625 FAX		 Sundaram Design Group, P.A. 1914 JONES FERRY ROAD, SUITE 200 RALEIGH, NORTH CAROLINA 27609 919-781-4624 VOICE 919-781-4625 FAX
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



-Y6A-		
PI Sta 20+81.72	PI Sta 20+96.47	
$\Delta = 134^{\circ} 26' 02.0''$ (LT)	$\Delta = 3^{\circ} 00' 07.2''$ (LT)	
D = 13' 48' 22.4"	D = 5' 09' 42.4"	
L = 973.72'	L = 58.16'	
T = 988.06'	T = 29.09'	
R = 415.00'	R = 1110.00'	
SE = .06	SE = .05	
RO = 100'	RO = EXIST.	
-Y5-		
PIs Sta 11+72.78	PI Sta 12+84.24	PIs Sta 13+96.72
$\Theta_s = 21^{\circ} 30' 00.0''$	$\Delta = 19^{\circ} 29' 59.5''$ (RT)	$\Theta_s = 21^{\circ} 30' 00.0''$
Ls = 200.00'	D = 21' 30' 00.0"	Ls = 200.00'
LT = 134.33'	L = 90.70'	LT = 134.33'
ST = 67.57'	T = 45.79'	ST = 67.57'
	R = 266.49	

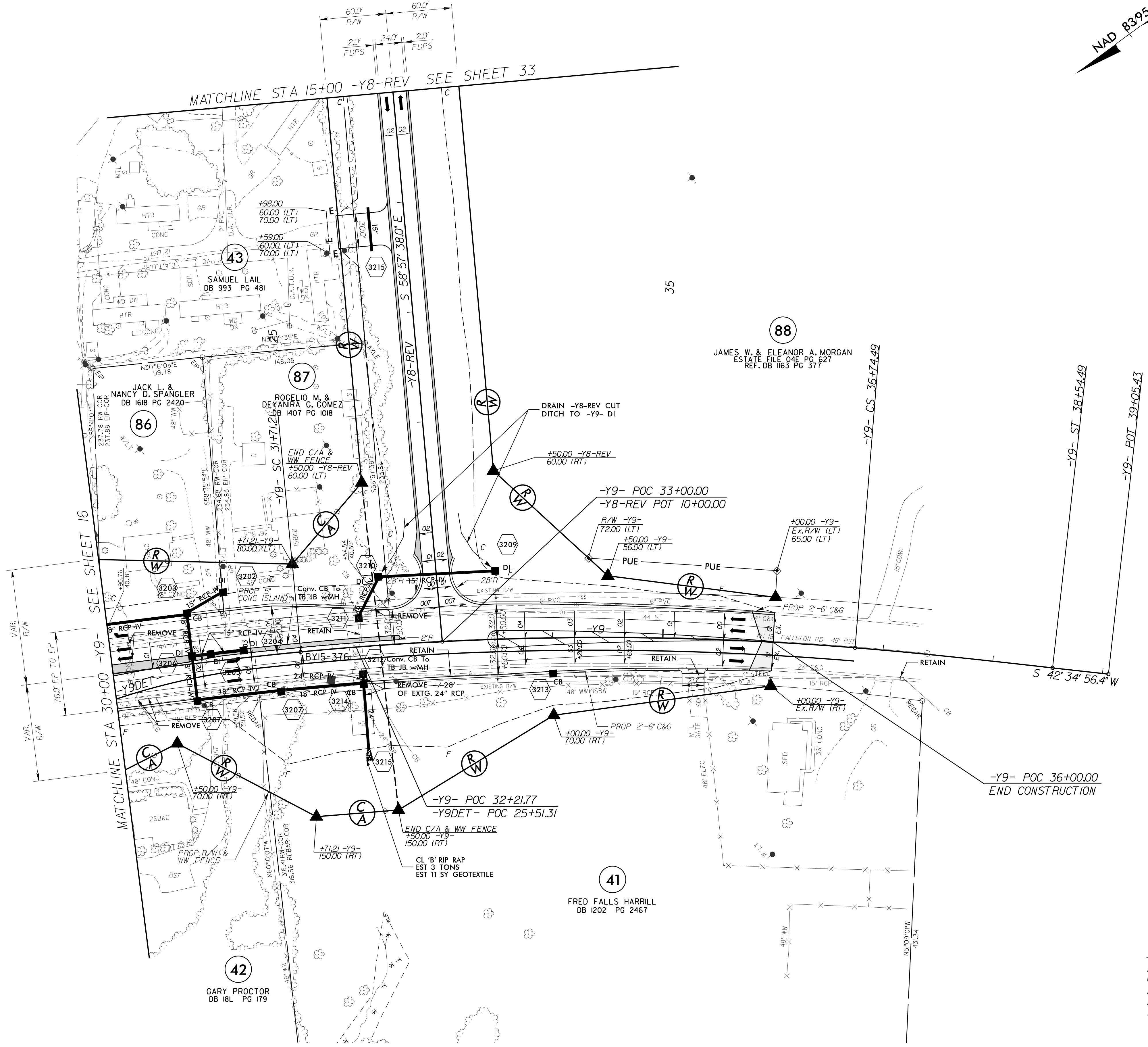
FOR -Y6A- PROFILE SEE SHEET 58
FOR -DR3- PROFILE SEE SHEET 58

PROJECT REFERENCE NO.		SHEET NO.
R-2707C		32
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 moffatt & nichol 1700 FALLS CHURCH ROAD, SUITE 200 FALLS CHURCH, VA 22034 TEL: 703-781-4600 FAX: 703-781-4601		 SDG Sundt Design Group, P.A. 10000 WOODBRIDGE LANE, SUITE 200 ROCKFORD, IL 60087 TEL: 815-398-7700 FAX: 815-398-7701
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REVISIONS

R/W REVISION 9-2-15 - PARCEL 43 - ADDED 30' DRIVEWAY ENTRANCE AT -Y8-REV STA.13+78 AND REVISED THE EASEMENT STATIONS.
R/W REVISION 11-23-15 - PARCEL 41 - ENLARGED CURB CUT TO ACCOMMODATE 20' WIDE DRIVEWAY AT -Y9- STA.35+77 TO 35+77 +/-.

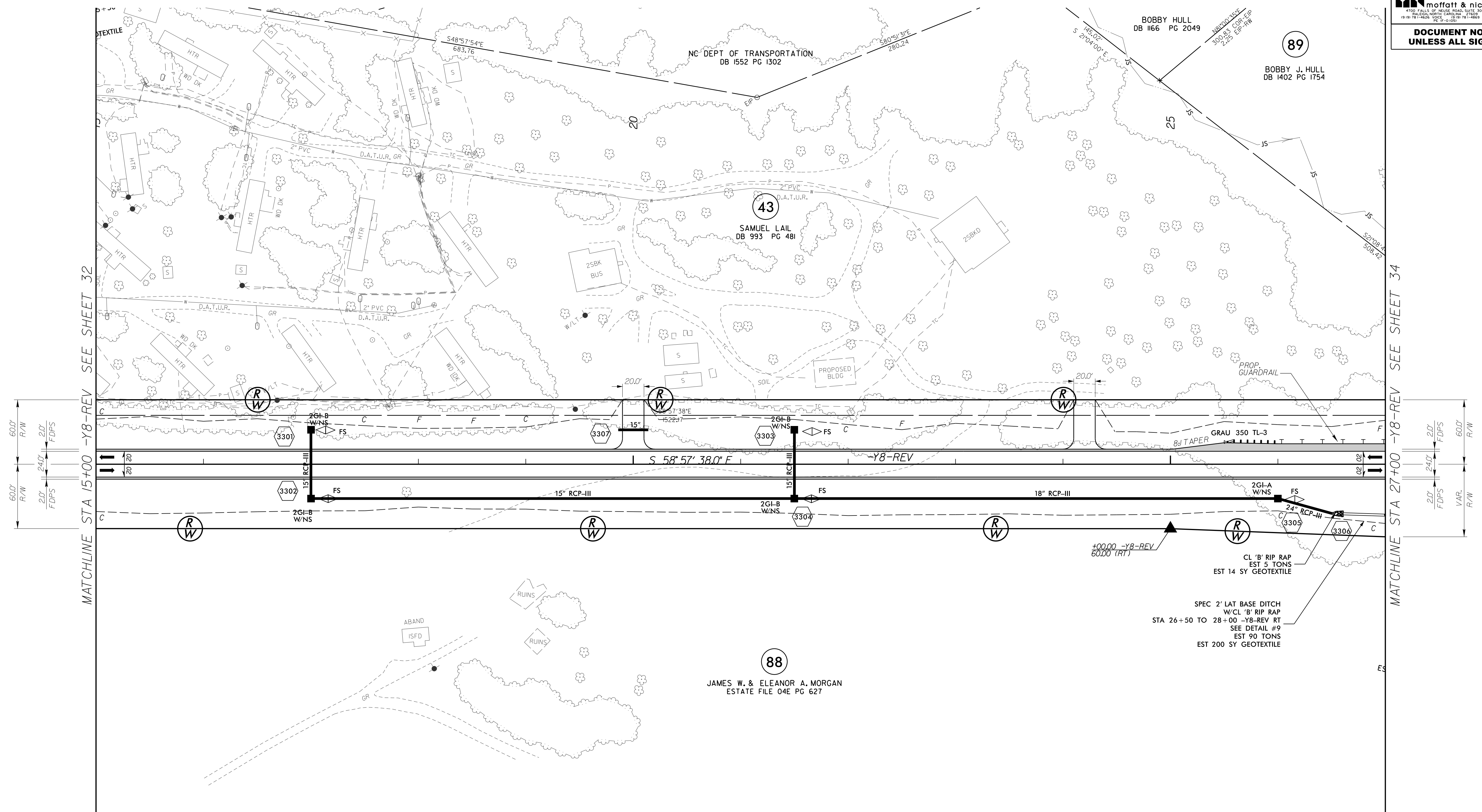


-Y9- DETOUR

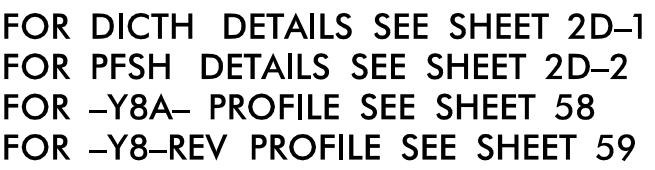
PI Sta 23+74.52
 $\Delta = 25^{\circ}07'00.2''$ (RT)
D = 6' 59' 14.2"
L = 359.46'
T = 182.67'
R = 820.00'

-Y9-		-Y9-
PIs Sta 31+11.21	PI Sta 34+23.50	PIs Sta 37+34.50
$\Theta_s = 1^{\circ}48'00.0''$	$\Delta = 10^{\circ}03'56.4''$ (RT)	$\Theta_s = 1^{\circ}48'00.0''$
Ls = 180.00'	D = 2' 00' 00.0"	Ls = 180.00'
LT = 120.01'	L = 503.28	LT = 120.01'
ST = 60.01'	T = 252.29'	ST = 60.01'
	R = 2,864.79'	
	SE = .04	
	RO = 180'	
FOR -Y9- DETOUR DETAILS SEE SHEET 2B-2		
FOR -Y8-REV PROFILE SEE SHEET 59		
FOR -Y9- PROFILE SEE SHEET 60		

PROJECT REFERENCE NO. <i>R-2707C</i>		SHEET NO. <i>33</i>	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF REUSE ROAD, SUITE 300 REIDLEIGH, NORTH CAROLINA 27640 (919) 351-4600 FAX (919) 351-4605 P.O. BOX 19-0105		SDG  Sungate Design Group, P.A. 514-A JONES FERRIS BLVD. RALEIGH, NC 27606	
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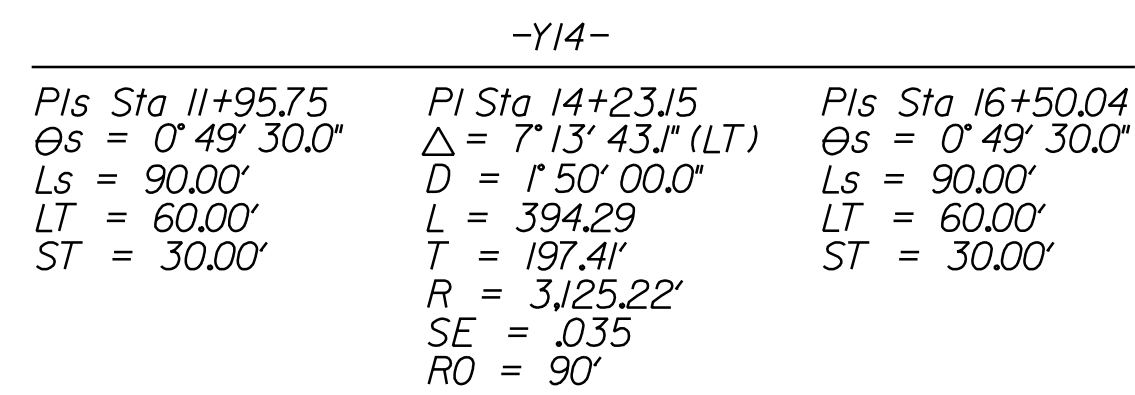


FOR DITCH DETAILS SEE SHEET 2D-1
FOR -Y8-REV PROFILE SEE SHEET 59

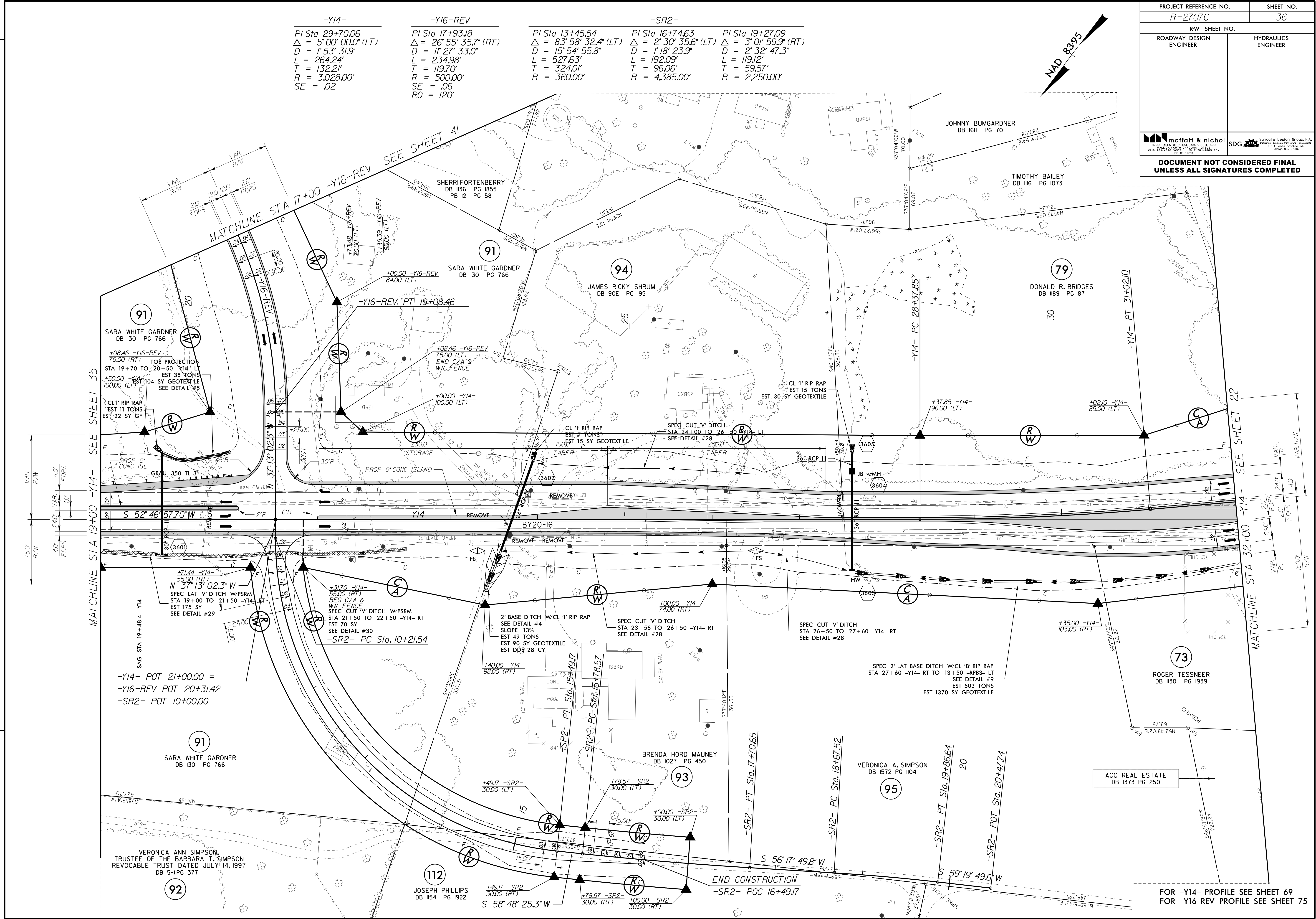


PROJECT REFERENCE NO. <i>R-2707C</i>		SHEET NO. <i>35</i>	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF REUSE ROAD, SUITE 300 REIDLEIGH, NORTH CAROLINA 27680 P.O. BOX 10310 • (919) 486-0000 • FAX (919) 486-0000 PE 19-010101		SDG  Sengate Design Group, P.A. 514-A JONES FARMSTEAD HIGHWAY RENO, N.C. 27626	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

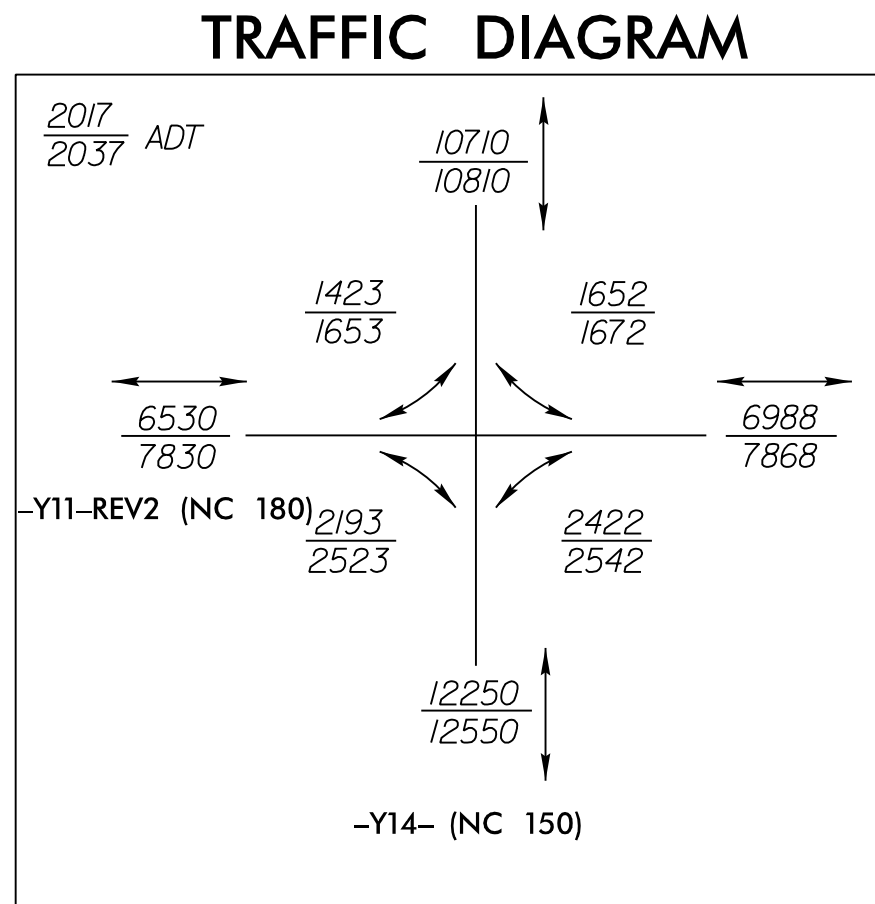
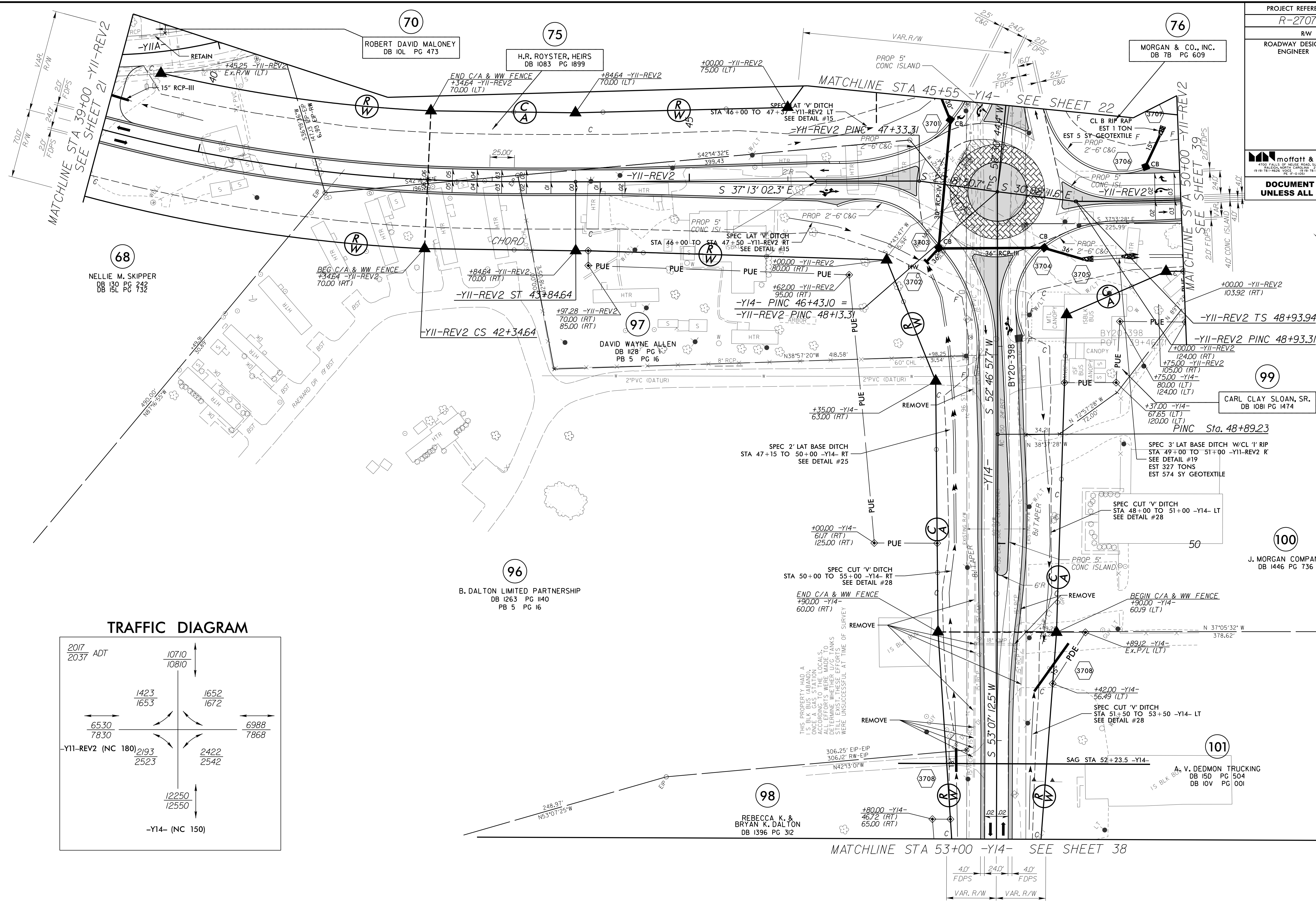
REVISIONS
R/R/W REVISION 10-05-15 (ESM) - PARCEL 92 - CHANGED PROPERTY OWNER NAME AND DEED INFORMATION.



FOR -Y14- PROFILE SEE SHEET 69



FOR -Y14- PROFILE SEE SHEET 69
FOR -Y16-REV PROFILE SEE SHEET 75

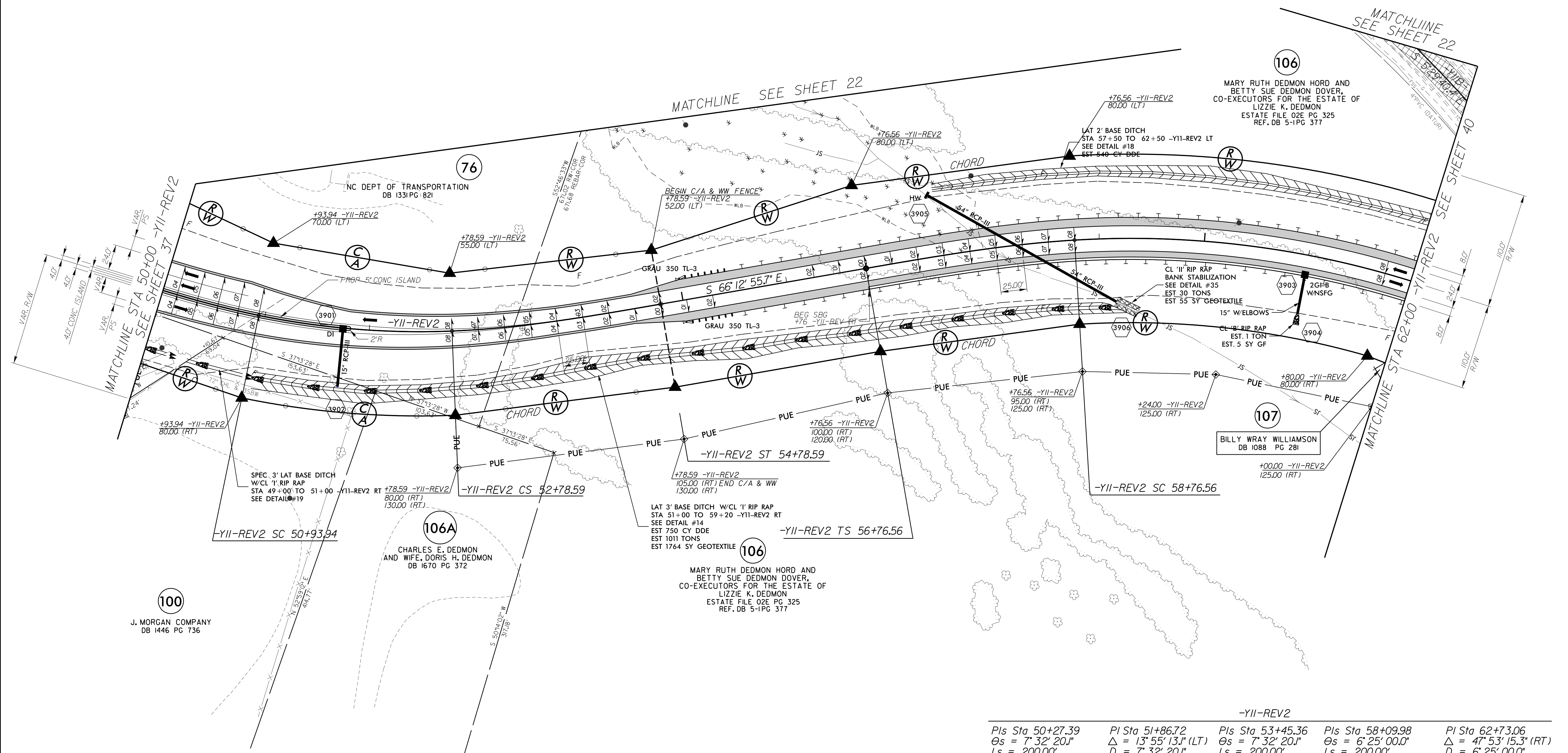


-Y11-REV2				-Y14-			
PI Sta 40+02.53	Pls Sta 42+84.65	Pls Sta 50+27.39	PI Sta 51+86.72	PI Sta 38+50.38			
$\Delta = 17^{\circ}10'47.2''$ (LT)	$\Theta s = 2^{\circ}45'16.6''$	$\Theta s = 7^{\circ}32'20.1''$	$\Delta = 13^{\circ}55'13.1''$ (LT)	$\Delta = 36^{\circ}14'03.9''$ (LT)			
D = 3'40'22.1"	Ls = 150.00'	Ls = 200.00'	D = 7'32'20.1"	D = 1'30'00.0"			
L = 467.76'	LT = 100.01'	LT = 133.45'	L = 184.65'	L = 315.08'			
T = 235.65'	ST = 50.01'	ST = 66.78'	T = 92.78'	T = 163.01'			
R = 1,560.00'			R = 760.00'	R = 498.22'			
SE = .06			SE = .08				

NAD 83/95



PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		39	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 300 BEAUFORT, NORTH CAROLINA 28526 (919) 738-9400 FAX (919) 738-9441 P.E. (F-01051)		SDG  Sungate Design Group, P.A. 3000 Suncoast Parkway, Suite 200 3141 Jones Creek Road Raleigh, NC 27605	
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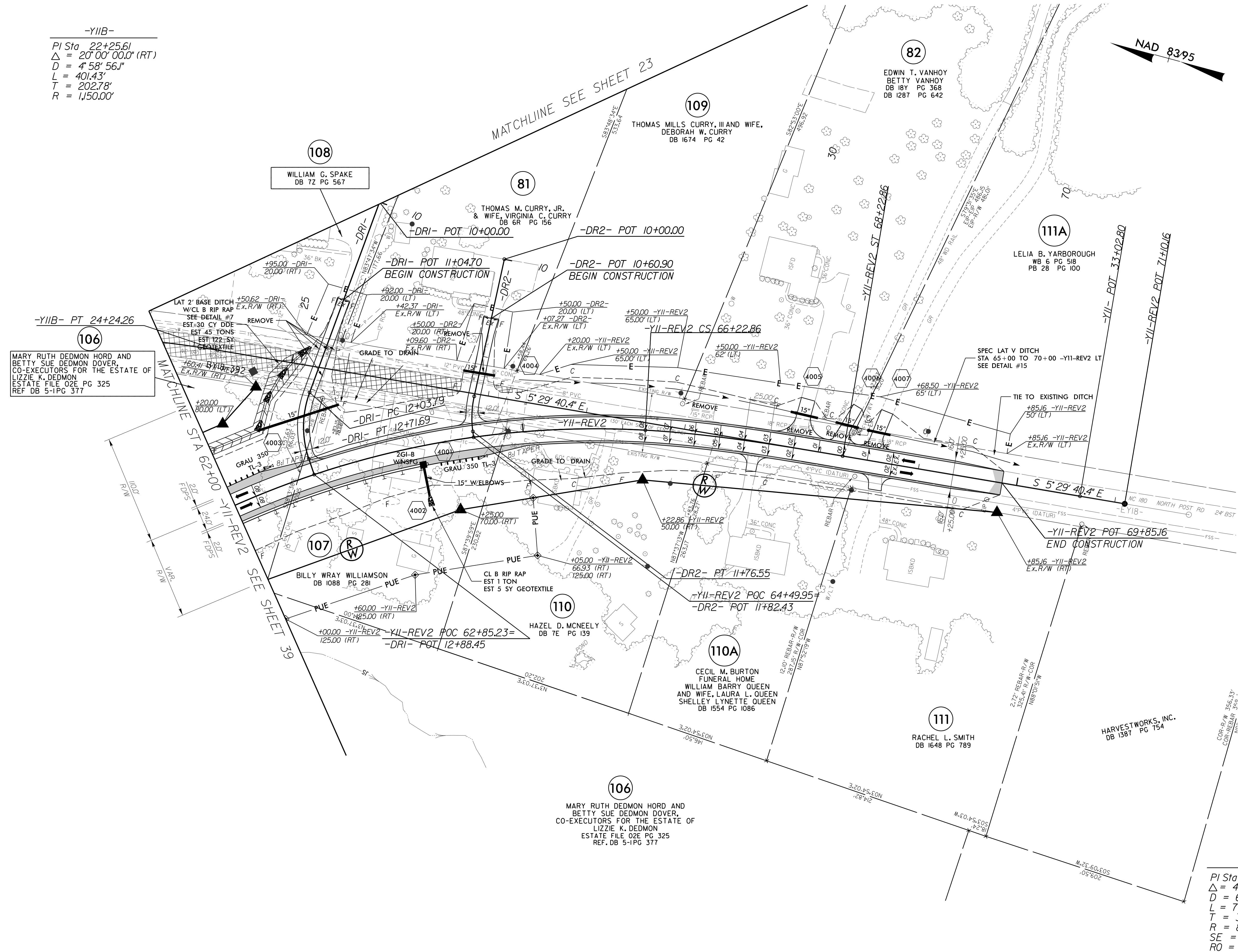
-YII-REV2				
<i>Pls Sta 50+27.39</i>	<i>Pl Sta 51+86.72</i>	<i>Pls Sta 53+45.36</i>	<i>Pls Sta 58+09.98</i>	<i>Pl Sta 62+73.06</i>
<i>Θs = 7° 32' 20.1"</i>	<i>Δ = 13° 55' 13.1" (LT)</i>	<i>Θs = 7° 32' 20.1"</i>	<i>Θs = 6° 25' 00.0"</i>	<i>Δ = 47° 53' 15.3" (RT)</i>
<i>Ls = 200.00'</i>	<i>D = 7° 32' 20.1"</i>	<i>Ls = 200.00'</i>	<i>Ls = 200.00'</i>	<i>D = 6° 25' 00.0"</i>
<i>LT = 133.45'</i>	<i>L = 184.65'</i>	<i>LT = 133.45'</i>	<i>LT = 133.42'</i>	<i>L = 746.30'</i>
<i>ST = 66.78'</i>	<i>T = 92.78'</i>	<i>ST = 66.78'</i>	<i>ST = 66.75'</i>	<i>T = 396.50'</i>
	<i>R = 760.00'</i>			<i>R = 892.92'</i>
	<i>SE = .08</i>			<i>SE = .08</i>
	<i>RO = 200'</i>			<i>RO = 200'</i>

PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		40	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 300 BEAUFORT, NORTH CAROLINA 28526 (919) 738-9400 FAX (919) 738-9401 P.E. (F-01051)		SDG  Sungate Design Group, P.A. 3000 W. US Highway 1, Suite 200 Raleigh, North Carolina 27606 919-436-6100 Fax 919-436-6101	
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REVISIONS

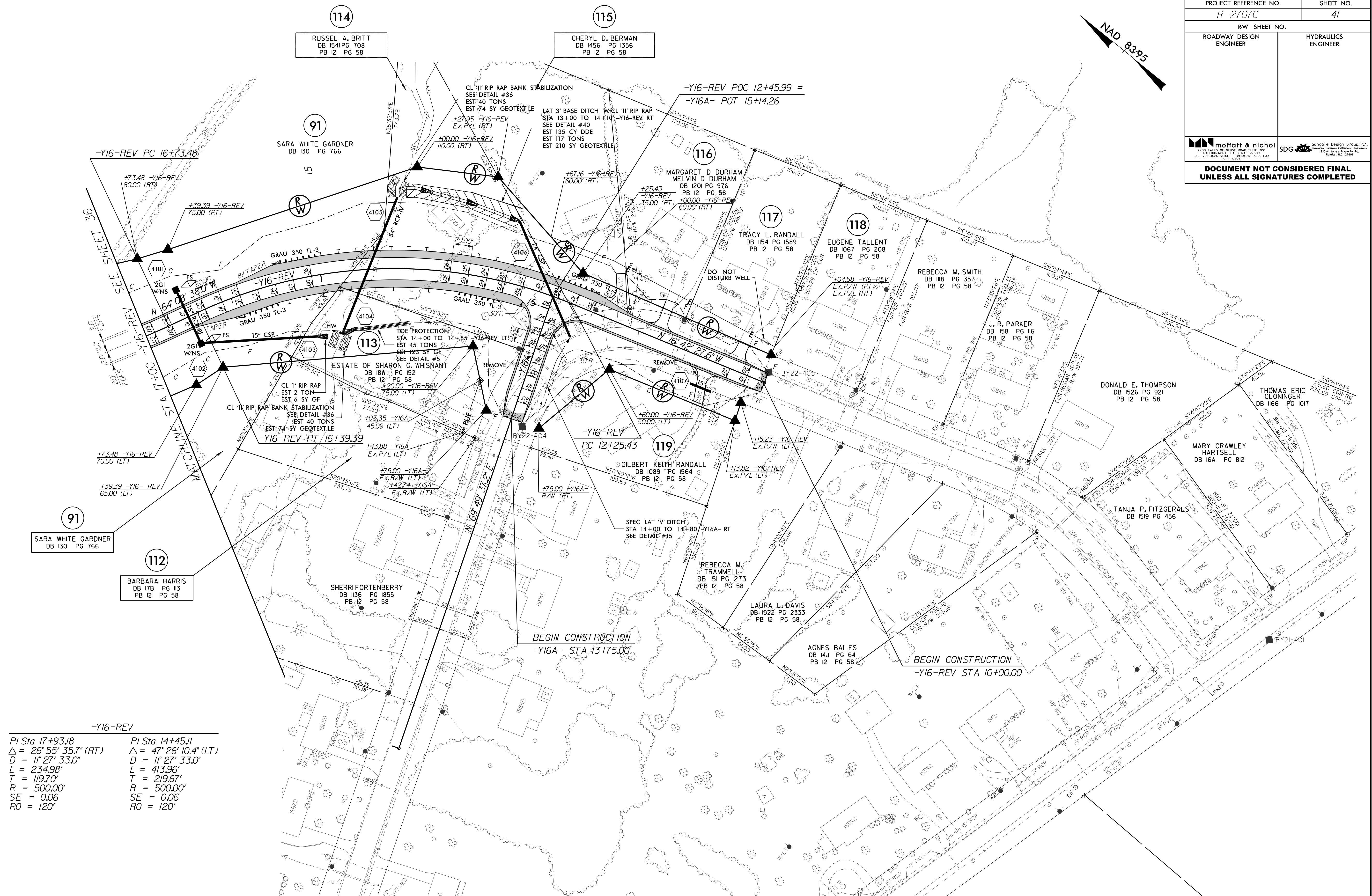
R/W REVISION 9-2-15 (PCP) - PARCELS 82 & 83 - COMBINED PARCEL 83 INTO PARCEL 82 / PARCELS 10A & 10IA - ADDED NEW PARCEL NUMBER AND OWNER INFORMATION

R/W REVISION 10-05-15 (ESM) - PARCELS 81, 106, 108, 109 AND 10IA - CHANGED PROPERTY OWNER NAME AND DEED INFORMATION.
- PARCELS 109 AND 10IA - CHANGED PROPERTY OWNER INFORMATION.



FOR -Y11-REV2 PROFILE SEE SHEET 67 & 68
FOR -DR1- PROFILE SEE SHEET 68
FOR -DR2- PROFILE SEE SHEET 68

PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		41	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEES ROAD, SUITE 300 BELLINGHAM, WASH. 98226 (360) 738-8800 FAX (360) 738-8808 P.O. PE 01-01053		 SDG Suncore Design Group, P.A. 916 1/2 Jones Freeman Rd. Bellingham, WA 98206	
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FOR -Y16-REV PROFILE SEE SHEET 75
FOR -Y16A- PROFILE SEE SHEET 75

PROJECT REFERENCE NO.		SHEET NO.	
R-2707C		42	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 300 BEAUFORT, NORTH CAROLINA 28526 (919) 738-9444 FAX (919) 738-9444 FAX P.E. (F-01051)		SDG  Sungate Design Group, P.A. 3000 W. US Highway 1, Suite 200 314 S. Jones Avenue Rd. Raleigh, NC 27605	
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